40 Rok

POPULAR Computing WEEKLY

35p 9-15 June 1983 Vol 2 No 23

This Week

Vic20 software
Mike Grace looks at a range of Vic20 games including *Traxx Lair*, *Jumpin Jack* and *Starship Escape* See page 14

Spectrum paint
Ian Logan presents a series of programs to 'fill-in' triangles rectangles and circles on page 20

Dragon scroll
Peter Chase explains how to scroll and shift blocks of memory and presents a simple demonstration game where you must avoid oncoming coloured blocks See page 22

New releases
All the latest games for a host of machines including *3D Combat Zone* from Artic and *Vultures* from J Morrison (Micros) See page 45

★STAR GAME★
Muncher on 16K ZX81. See page 10.

News Desk

Wealth of new software at ZX fair

THERE was plenty of interest for the 8,000 visitors to London's 7th ZX Microfair, held last Saturday at the Alexandra Pavilion

Most of the 140 or so exhibitors were software houses, once again demonstrating the strength of independent support for the Sinclair machines

Of the companies exhibiting for the first time the Edinburgh-based Protek made the biggest impact with six titles for the Spectrum and ZX81 Other newcomers were Elephant, Electra, Gilsoft and Apocalypse Vortex and Quest both appeared at a show for the first time with *Gun Law* and *The Black Hole*, respectively

Romik, best known for its Commodore and Dragon material, launched into the ZX arena with four titles for the Spectrum — *3D Monster*

Continued on page 5



96K Lynx in the high street soon!

A 96K version of the Lynx microcomputer should be in the shops at the end of this month Camputers hopes to display the new Lynx-96 at the Earls Court Computer Fair beginning on June 16

The enlarged Lynx will cost £299 and will include some Rom features not available on the 48K machine It will have printer driver routines for both serial and parallel interface printers and a number of pre-programmed sound effects In all the 96K machine will have 20K Rom compared with the Lynx-48's 16K Rom

It will be possible to upgrade the present 48K Lynx to 96K by sending your machine back to Camputers, but it will cost £89 95 That price includes both the Ram and Rom up-grades

In August, Camputers hopes to launch its delayed Lynx disc drives These will be 5¼ inch, single-sided, double-density, 40-track, disc drives

Continued on page 5

Continued on page 44


Critical review?
“The sound commands on the Oric I are for a computer of this price very sophisticated Three music channels and one noise channel mean that you can program some fairly complex sounds”
POPULAR COMPUTING WEEKLY
“Oric is everything you hoped it would be Alive with colour and zapping with built-in sound effects the Oric looks like a match for any machine now selling for less than £200”
YOUR COMPUTER
“The 16k Oric – fighting the 16k Spectrum – is £25 cheaper It feels a good deal more professional than the home-appeal Sinclair Oric s sound is extremely versatile and well up to the standard of the £300 or £400 BBC microcomputer made by Acorn”
WHICH MICRO?
“Oric was over twice as fast as the Spectrum Surprisingly perhaps the Oric which initially seemed only faster when performing the simplest of calculations has come back to beat the Spectrum by a small amount. As the problems get more complex the Oric comes into its own Oric final point – in entering the benchmark tests – the Oric was certainly the easiest to handle”
WHICH MICRO?
“This slope coupled with the design of the keys makes the Oric an easy machine to touch type on All keys have auto-repeat and there are four keys dedicated specifically to cursor control It is certainly easier to type on than any of Sinclair s offerings.”
YOUR COMPUTER
“Oric will soon be … a Modem so that Prestel will become available Owners will be able to accept telesoftware programs loaded straight down the phone line – eventually electronic mail could come into the home by the same route and with the addition of a tape recorder the Oric with its Modem could become a telephone answerer and message taker”
YOUR COMPUTER
“One good feature of the Oric is an on-screen reminder in the top right hand corner to show that you ve engaged all capitals mode So much better than the BBs variety of lights in the corner of the keyboard The Oric is sound simple to get along with and offers great expansion potential”
WHICH MICRO?
“When compared to the sloggness of the Spectrum s keyboard this is certainly an improvement. I can t see any Orics failing through bad assembly. If only the £2400 IBM were so easy to use”
WHICH MICRO?
“Instead of the Spectrum s 28 look-up single-character error reports, the Oric has 18 self explanatory messages If you actually want to do computing rather then just exploring the world of off-the shelf games programme entertainment the Oric will be a better buy.”
WHICH MICRO?
“A good speaker and built in noises get the Oric s sound off to a good start Typing Zap Ping Shoot or Explode produces convincing arcade game noises which can easily be incorporated into any program”
YOUR COMPUTER
“The modem is certainly unusual in a machine of this price Together with the other peripherals, when finally available it should make for an attractive package for a small business surely a match for machines costing much more”
POPULAR COMPUTING WEEKLY
ORIC-1
The Real Computer System
ORIC PRODUCTS INTERNATIONAL LTD. COWORTH PARK LONDON ROAD ASCOT BERKS
available from… WHSMITH ● DIXONS ● GREENS
LASKYS ● MICRO'C' ● MICRO PERIPHERALS
SPECTRUM ● COMPUTERS FOR ALL
And hundreds of independent dealers.



9-15 June 1983 Vol 2 No 23



The Team

Editor
Brendon Gore

News Editor
David Kelly [01 930 3271]

Software Editor
Graham Taylor [01-839 2504]

Production Editor
Lynne Constable

Editorial Secretary
Caroline Owen

Advertisement Manager
David Lake [01 839 2846]

Advertisement Executive
Alastair Macintosh [01-930 3260]

Classified Executive
Diane Davis [01 839 2476]

Administration
Theresa Lacy [01-930 3266]

Managing Editor
Duncan Scot

Publishing Director
Jenny Ireland

Popular Computing Weekly
Hobhouse Court, 19 Whitcomb Street
London WC2 7HF
Telephone **01-839 6835**
Published by Sunshine Publications Ltd
Typesetting origination and printing by
Chesham Press Chesham Bucks
Distributed by S M Distribution
London SW9 01 274 8611 Telex 261643

Subscriptions
You can have *Popular Computing Weekly* sent to your home

UK Addresses	
26 issues	**£9 98**
52 issues	**£19 95**
Overseas Addresses	
26 issues	**£18 70**
52 issues	**£37 40**

How to submit articles
Articles which are submitted for publication should not be more than 3 000 words long The articles and any accompanying programs, should be original It is breaking the law of copyright to copy programs out of other magazines and submit them here — so please do not be tempted

All submissions should be typed and a double space should be left between each line Please leave wide margins

Programs should whenever possible be computer printed

We cannot guarantee to return every submitted article or program so please keep a copy If you want to have your program returned you must include a stamped, addressed envelope

Accuracy
Popular Computing Weekly cannot accept any responsibility for any errors in programs we publish although we will always try our best to make sure programs work.

This Week

Editorial

Robotics looks like becoming the next high technology industry to undergo a 'boom' Not this month, or next month, or even next year, but soon

Robotics, for those who are unfamiliar with the term, is the science of robots — machines that can walk, talk speak understand commands and otherwise imitate human behaviour

Robots have been popularised by science fiction authors such as Isaac Asimov and in films such as *Star Wars* but, until recently there has been little sign that robots would ever become more than fictional characters Admittedly, industrial robots are becoming increasingly common, particularly in Japan, but they are specialised machines dedicated to particular tasks They do not possess the intelligence, adaptability or mobility which are the hallmarks of the true robot

Now, however, companies which have specialised in microcomputers and other high technology areas, are actively looking at 'home' robots Atari founder Nolan Bushnell has already set up a new company — Androbot — to develop and manufacture such robots

The microcomputer 'boom' still has a long way to run, but companies such as Sinclair might be well advised to start working on personal robots before they get left behind But then, who knows? Maybe Sinclair is already developing a 'metal mickey' of his own

Next Thursday

Play our Star Game and try and line up four counters horizontally, vertically or diagonally. Connect 4 — next week's game for the BBC by M Kendrick.


WINDOW ON ANOTHER WORLD
NEW RELEASES
STAR JAMMER — Wiping the sweat from my brow I searched the inky blackness ahead for signs of enemy fighters. Through Star Jammer was the best ship in the galaxy my dwindling energy reserves made me doubt I could reach the next stargate (1 one player space arcade game requiring one joystick)
SUPER SKILL HANGMAN Hangman as you've never played it before! A vocabulary of over 1 000 words, three levels of difficulty and an optional timer make this classic word game a challenge for kids of all ages
NIGHTFLIGHT — An accurate simulation of flying a single engine light aircraft. Nightflight allows for take-off, landing and aerial manoeuvres including loops and rolls
SALAMANDER GRAPHICS SYSTEM — A comprehensive picture drawing system for the home computer enthusiast. Pictures in any mode or colour set, text on the hi res screens and storage of pictures on tape. Requires one joystick
ORIC TREK — A version of our classic Dragon Trek for the Oric 1! Ten levels of difficulty, three sizes of galaxy and more features than you can shake a Klingon at. A must for all Oric owners!
ORIC GAMES COMPENDIUM — Four exciting games for the whole family: Donkey Derby, Kingdom, Viper and Space Station
DRAGON 32 and TANDY 32K (please specify). Dragon Trek £9.95 Wizard War £7.95 Golf £7.95 Grand Prix £7.95 Vulcan Noughts & Crosses £7.95 Games Comp D1 £7.95 Salamander Graphics System £9.95 Super Skill Hangman £7.95 Star Jammer £7.95 Nightflight £7.95
BBC MODEL B. Dragon Rider £7.95 Tanks! £7.95 Games Comp B1 £6.95 Games Comp B3 £6.95 EDG Graphics (tape) £24.95 EDG Graphics (disc) £29.95
ORIC 1 Oric Trek £9.95 Games Comp 01 £7.95
NOW AVAILABLE AT MAJOR BRANCHES OF
Boots
AND
spectrum
Mail Order (add 50p p&p) and Catalogues (send SAE) from Dept C SALAMANDER SOFTWARE 27 Ditchling Rise Brighton East Sussex BN1 4QL Tel 0273 771942
Salamander Software

ZX microfair

Continued from page 1

Maze Colour Clash Galactic Trooper and *Spectra Smash*

Nearly all of the established houses presented new titles for the Spectrum Artic showed *3D Combat Zone 3D Quadracube Cosmic Debris* and *Sys 64* (a 64 column printer routine) Abersoft had *The Wizard s Warriors* Lothlorien displayed a new wargame, *Johnny Reb* and PSS showed *Light Cycle*

Both East London Robotics and Fuller were up-grading 16K Spectrums to 48K on the spot while FB Electronics demonstrated a 24-line port and motherboard for operating a Colne Robotics Zeaker Micro Turtle

Adding some controversy to the show, Scimitar and Keysoft both exhibited programs enabling back up copies of 'protected software to be made — *Zap 2* and *The Key*

Descent into the valley!

A ROW has broken out between two software companies, both selling games called *The Valley*

Magazine publisher Argus Specialist Press is claiming that a program first advertised by Kayde as *The Valley* — and now called *The Swamp* — is in fact a version of a game published in listing form in the magazine *Computing Today*

'The Kayde program is definitely a version of the game published in the April 1982 issue for the Pet and TRS-80' , claimed Henry Budgett, Argus' Group Software Editor Since then Argus' software division had produced versions of the game on cassette for the Pet, Vic, Apple, Atari, BBC Spectrum and Dragon machines

Kayde put out its program called *The Valley* for the 16K Vic20 in the summer of 1982 and has followed that with versions for the One 48K, Spectrum 48K, New Brain Dragon 32 and Commodore 64

Following recent heavy advertising of its *Valley/Swamp* program Kayde has been contacted by Argus who has asked for the titles to be withdrawn

Kayde's Dean French who confirmed that he had received the communication from Argus, said Our response is that we will continue to sell the game It is true that our programmer took the idea for the game from the magazine but it is entirely our own conversion We had the game available for the Vic, long before Argus ever did

'We have every intention of continuing with the program," he added

Argus company secretary, Mike McKenna commented "We have now referred the matter to our legal advisors "

There have been two previous occasions where Argus has argued that the copyright in its *Valley* program has been infringed In both cases the companies involved have agreed to pay Argus compensation

The more recent of the two cases concerned the London based software house Computer Rentals The program involved, *The Orb* for the Spectrum was withdrawn from sale and Computer Rentals paid Argus a "very substantial sum of money"



Clement Chambers of Computer Rentals said "*The Orb* was created specially for us We had never seen a copy of *The Valley* and, as soon as Argus contacted us, we agreed to withdraw our title

98K Lynx

Continued from page 1

The drive comes with its own Lynx operating system The single disc unit plus operating system and controller card will cost £343 85 Subsequent drives — up to three more can be connected — will not require further controller cards and will be priced at £228 85

Neither the present 48K machine or the new 96K model are capable of supporting CP/M For that the 128K Lynx is required That machine together with a CP/M card for the disc drive is planned for the autumn price tentatively put at around £440

Those with either of the two smaller Lynx models will have to buy an up-grade to run CP/M

The Lynx is, in theory, infinitely expandable It incorporates a unique method of switching blocks of 64K Ram, enabling the Z80 processor at the heart of the Lynx to handle more than 64K

However, whichever model is used, only a portion of the Ram can be addressed by the Lynx Basic There is only 13 75K Basic Ram available in the 48K machine and 37 5K available in the 96K model

The screen drive (each pixel on the Lynx screen is dot-addressable in eight colours) take up a further 32K which leaves, in the case of the 48K machine nothing, and in the case of the 96K model, 24K This remaining memory on the new model can be used for machine-code storage or to hold another language or operating system loaded from either disc or cassette



Commodore goes for broke

THE price of the Commodore 64 computer will come down substantially in July

This will form part of a complete review of Commodore's pricing structure The Vic20 will stay in its new package together with the data recorder and software at £139 99, but the rest of the range will be repriced

No details of the new prices are so far available but the cost of the Commodore disc drives and Rom cartridge software will fall in addition to the cost of the Commodore 64

How far the 64 comes down will depend on how close to the Vic20 price the company can go without affecting sales The Commodore 64 machine is certainly not selling as well as Commodore would like at its present £345 price

In the US, the machine sells in a special discount scheme for $239 (around £155)

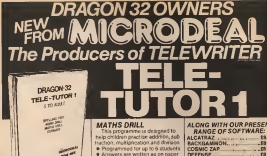
If the 64 comes down anywhere near that price it will put pressure on manufacturers like Dragon and Computers to reduce their prices further

Electron goes bi-lingual

ACORN now has a version of BBC Forth running on its new Electron machine

Still in the prototype stage Electron Forth required almost no modification from the BBC version So far there is no indication of when the Electron Forth will be available or how much it will cost

● BBC Forth itself is now on sale It is available on cassette or disc, priced at £16 85 and £19 90 respectively A manual is also available — price £7 50 BBC Forth occupies about 11K Ram This means that you cannot run Modes 0 to 3 on a BBC Model B with Forth To solve this, Acorn is working on a Rom version which is now well advanced



SPELLING TEST

This programme is designed to give a standard oral spelling test, using the sound track of the tape recorder to dictate either single words or words and sample sentences. The responses are then typed using the keyboard, which will subsequently be displayed on the screen and if required, can be kept as a permanent record using a printer.

WORD DRILL

This programme is designed to give a multiple choice vocabulary quiz. Words and their definitions are entered into the programme using the keyboard or from a previously prepared tape file. The computer will then display randomly selected definitions with a choice of eight words. The correct word must be chosen before the preset timer reaches zero. This programme could be used for words and definitions, a geographical quiz, chemical formulae etc.

MATHS DRILL

This programme is designed to help children practise addition, subtraction, multiplication and division.

- Programmed for up to 6 students
- Answers are written as on paper
- Division can be written showing "remainder"
- Ten different skill levels
- 'Smiley' face and graphics used as rewards
- Skill levels adjust to ability
- Problems timed
- Correct answers are displayed if error made
- Full report at end of test

ESTIMATE

This programme is designed to help children practice their mental arithmetic. A selection of addition, subtraction multiplication and division is given.

- Programmed for up to 5 students
- Five skill levels
- Time taken to answer is recorded
- Correct answers are displayed if error made
- Full report at end of test

AN INSTRUCTION MANUAL IS INCLUDED IN THIS PACKAGE SUITABLE FOR CHILDREN AGED FIVE to ADULT

ALONG WITH OUR PRESENT RANGE OF SOFTWARE:

ALCATRAZ	£8 00
BACKGAMMON	£8 00
COSMIC ZAP	£8 00
DEFENSE	£8 00
DRAGON INVADERS	£8 00
ESCAPE	£8 00
FLIPPER	£8 00
GALACTIC AMBUSH	£8 00
INVADERS REVENGE	£8 00
JERUSALEM ADVENTURE 2.	£8 00
KATERPILLAR ATTACK	£8 00
MANSION ADVENTURE 1	£8 00
PHANTOM SLAYER	£8 00
PLANET INVASION	£8 00
PROGRAM PACK 1	£8 00
PROGRAM PACK 2	£8 00
PROGRAM PACK 3	£8 00
PROGRAM PACK 4	£8 00
PROGRAM PACK 5	£8.00
RACER BALL	£8 00
SCARFMAN	£8 00
SPACE MONOPOLY	£8 00
SPACE WAR	£8 00
STORM	£8 00
TALKING ANDROID ATTACK	£8 00
THE KING	£8.00
WILLIAMSBURG ADVENTURE 3	£8.00
ULTIMATE ADVENTURE 4	£8 00
TELE WRITER WORD PROCESSOR	£49 95
TELE-TUTOR	£25.00

HARDWARE

JOYSTICKS *pair* .£18 85
LIGHT PEN WITH PROGRAMS £12.00

Tele-Tutor costs £25 on cassette and is

AVAILABLE FROM DRAGON 32 DEALERS NATIONWIDE OR DIRECT FROM:

MICRODEAL

14 TRURO ROAD, ST. AUSTELL,
CORNWALL, PL25 5JE. TEL: 0726-67676.

TELE-TUTOR IS AVAILABLE FROM SELECTED John Menzies SHOPS

A vested interest

Following your editorial concerning Top 10 Charts (12-18 May edition) I really feel you are being incredibly naive in expecting anybody to compile (or believe in) a chart based on manufacturers' actual sales figures. Can you imagine that any of the big software houses would admit that their multi-page, mega-colour advertisements had not each sold a million? Or conversely, after 20 full-colour pages of hype that they have yet to write a program? Manufacturers have a vested interest in promoting their own image and so their figures cannot be relied upon.

For the past year or so the Buffer Shop has had the thankless (and totally unpaid) task of providing the "Sinclair" Top 10 lists to a variety of magazines. The figures are obtained by the simple means of counting the tapes on the shelves each week. Of course our charts are not fully representative because, although we keep a larger range of software for Sinclair micros than anyone else, we stock only the tapes we like or that appear to have some value. We reject those that we consider to be trash, "copy-cats" or that just do not hold our interest, even if they are nationally advertised and stocked by the chain stores.

As with the pop record industry, the most sensible way of judging sales is to average the charts supplied by a number of shops, even though this would mean that the magazines would have to do a little work themselves, for a change. It would also have the beneficial effect that it might relieve us of the stream of attempted bribes, coercions and general incompetence that we fend off every week. On the other hand, how honest can any magazine be when faced with pressure from big, free-spending advertisers? Which magazine will put honesty and integrity before profit and accept advertising only for products which are actually available?

M Howard
Buffer Micro Shop
310 Streatham High Road
London SW16 6HG

If you look closely at our editorial of 12-18 May, you will see that we never expected anyone to compile (or believe in) a chart based on manufacturers' actual sales figures. What the editorial actually said was: "What is needed is an independent chart which accurately reflects the state of the market. But, such a chart could not be compiled by any one magazine, software company or retail chain.

"Ideally, the Computer Trade Association should approach a body such as the British Market Research Bureau and ask it to compile a Top 10 chart."

Since the publication of this editorial we have been in contact with both the CTA, the BMRB and other market research organisations, with a view to compiling just such an independent chart.

Fair play!

With regard to the Softek compiler payments dispute, it should be clear to anyone with a sense of fair play that Softek are wholly justified in demanding royalties on any commercial program which makes use of their compiler. After all, Softek are paying royalties to Sinclair Research for the use made of the Spectrum operating system by Softek programs — aren't they?

Alan Clayton
West View
Blakenhall
Nantwich
Cheshire

Memory gobbler

The letter from C Whitehead (*Popular Computing Weekly* Vol 2 No 15) made a valid point. However, the suggested improvement to "Board Game" gobbles up more memory, when Run, than the original listing. The problem memory user is the dimensioned array (*10 Dim Table (75)*). The original handling takes 400 bytes to write while the suggested improvement takes only 200 bytes to write — but 600 bytes to Run!

I have enclosed an alternative listing for the *Inkey$* handling, which takes only 140 bytes to Run.

```
550 A$=INKEY$ IF|
    A$="" THEN550
560 IF A$="X"THEN
    10
570 V=VAL(A$) IF|
    V>0 AND V<8 THEN
    L=20*V+5 F1=1:
    GOTO 750
580 V=ASC(A$) IF
    (V>64 AND V<76
    THEN D=(V-64)*
    20+5 F2=1
```

E Wells
129 St Richards Rd
Deal
Kent CT14 9LD

Not letting on!

I have a tape that my dad bought me. The tape is called *Escape*. I found out the secret code in 10 minutes — it was the easiest game I have ever had. When I started again, I timed myself — it took me 11.14 seconds to get out. I know the secret code off by heart, but I'm not telling you!

Michael Lunn (10½)
47 Westbury Drive
Macclesfield
Cheshire
SK11 8LJ

The wrong use

I was disappointed to see Chris Seely's *Pythagoras* program on the Spectrum page of your magazine (*PCW* Vol 2 No 17).

I have been following the debate on uses of computers for education quite closely, and I feel that this is the wrong use for them. Any pocket calculator could do what that program does.

So I have enclosed a short program which demonstrates Pythagoras' theorem graphically, which I feel is of more educational value than the one shown.

```
[illegible]
```

Ian Turton
111 Barden Rd
Tonbridge
Kent

Unnecessary change

Recently the Top 10 list for the Vic20 has had a change of source from 'The Vic Centre' to Boots & Co'. This seems to me an unnecessary and unfair change, since the range of software held by the Vic Centre is far superior to that of Boots. This is from personal experience in trying to find certain products.

The Boots software section consists of Commodore, Bug-Byte, Audiogenic, Imagine and Thorn EMI cassettes and cartridges, whereas the Vic Centre carries all these products and many more including Llamasoft, Rabbit and Interceptor. On many recent occasions Llamasoft has occupied the top two places and more in your list (on 31 March five out of the 10 including 1, 2, 3), but since the change in source none of the Llamasoft programs have appeared. Considering the widespread knowledge of *Grid Runner*, this surprises me.

Surely it is sensible to use a source which bases figures on a wider range of software, such as the Vic Centre?

D Smith
20 Down Close
Northolt
Middx

Unfortunately, the Vic Centre has closed its retail outlet, hence the switch to Boots. However, we are actively seeking ways of making the Top 10 charts as representative as possible.


STARTECH
Absolutely the lowest prices!
16K
MEMORY EXPANSION CARTRIDGE
VIC 20
16K RAM PACK
£28.95
Including VAT and Postage and Packing.

Muncher

A new game for the 16K ZX81 by S Lancaster

This games program for the 16K ZX81 is called *Muncher* You control the *Muncher* with the cursor keys, eating the dots and dodging the two ghosts which do their utmost to eat you This game has an added twist which makes it more difficult because you cannot go back on the trail of black squares you leave behind.

However the ghosts leave trails of dots which may let you retrace your path if you are lucky and you last that long When you are caught by the ghosts your score — the number of dots you have eaten — is given The game starts again when any key is pressed

Lines 10+ set up the maze Lines 20+ set up the score and the positions of the ghost and the *Muncher* Lines 50-75 allow the *Muncher* to move through the maze without eating it and to score points

Lines 80-120 allow the first ghost to pursue you and 130-170 do the same for the second Lines 300-305 give the score and reset the game if a key is pressed Lines 400 and 401 allow the game to run automatically when it is loaded, but this only works if the game is not *Saved* as usual — Run 400 should be entered before recording it

This game is challenging but fun to play It is quite fast even though it is in Basic and the ghosts are intelligent enough to catch you every time ■

```
10 PRINT AT 0,0 "[redacted]
11 FOR N=1 TO 10
12 PRINT [redacted]
13 PRINT [redacted]
14 NEXT N
16 PRINT AT 20,0, [redacted]
20 LET S=0
21 LET A=10
22 LET B=15
23 LET X=1
24 LET Y=1
25 LET J=19
26 LET K=29
30 PRINT AT A,B, "■",AT X,Y,
"■",AT J,K,"■"
40 LET C=A
41 LET D=B
42 LET M=X
43 LET N=Y
44 LET G=J
45 LET H=K
50 LET A=A+(INKEY$="6")-(IN
KEY$="7")
54 LET B=B+(INKEY$="8")-(IN
KEY$="5")
55 PRINT AT A,B
60 LET P=PEEK (PEEK 16398+
256*PEEK 16399)
70 IF P=136 OR P=128 THEN
LET A=C
71 IF P=136 OR P=128 THEN
LET B=D
72 IF P=155 THEN LET
75 PRINT AT A,B,"C"
80 LET L=INT (RND*2)
81 GOTO L+82
82 LET X=X+SGN (A-X)
83 LET Y=Y+SGN (B-Y)
90 PRINT AT X,Y,
100 LET P=PEEK (PEEK 16398+
256*PEEK 16399)
110 IF P=136 THEN LET X=M
111 IF P=136 THEN LET Y=N
112 IF P=40 THEN GOTO 300
120 PRINT AT X,Y,""""
130 LET L=INT (RND*2)
131 GOTO 132+L
132 LET J=J+SGN (A-J)
133 LET K=K+SGN (B-K)
140 PRINT AT J,K,
150 LET P=PEEK (PEEK 16398+
256*PEEK 16399)
160 IF P=136 THEN LET J=G
161 IF P=136 THEN LET K=H
162 IF P=40 THEN GOTO 390
170 PRINT AT J,K,""""
180 GOTO 30
300 PRINT AT 0,11, SCORE ;S
301 PRINT AT 20,4, "PRESS ANY
KEY TO PLAY
302 FOR N 1 TO 50
303 NEXT N
304 IF INKEY$="" THEN GOTO
304 305 RUN
400 SAVE "■"
401 RUN
```

First of a family!

***David Kelly** talks to Michael Lunch – new head of Mattel Electronics (UK)*

Mattel is one of the world's bigger toy companies. Last year the company — based in Hawthorne, Los Angeles — showed a turn-over of just over $1.5bn.

Like other toy manufacturers Mattel has had to increase the technical complexity of its products to keep pace with young consumers of ever-increasing sophistication.

In 1979 Mattel announced its first 'electronic' product — the Intellivision video games player system — as a direct competitor to Atari's VCs machine launched a year earlier.

Mattel obviously feels that its push into this new area was worthwhile, because it is now on the point of launching another machine — the Aquarius family computer. The Aquarius and the Intellivision will be handled in this country by a new division set up for the purpose, called Mattel Electronics.

To head up the new company Mattel has chosen the former managing director of consumer electronics for Texas Instruments (UK), Mike Lunch. And to help establish the Aquarius and extend the market for the Intellivision it has given him over £5m to spend on promotion.

Mike Lunch is a punctilious 35 year-old with a charming smile. He began his career with an unusual degree — joint honours in Industrial Engineering and Management. He then trained as a chartered engineer, before moving across to marketing with an electronic instruments manufacturer. Next, he became marketing manager of a company that made security systems (radio controlled door systems just like *The Man from U.N.C.L.E.*) and by an act of fate, he was then made director of engineering!

Hovering on the fence!

He hovered on the fence until 1979 when he jumped in the direction of marketing again. He joined Texas Instruments to launch the TI 99/4 home computer.

The TI computer was one of the first home computers and, for some 18 months it was only available in the UK in its NTSC form (the American TV system standard). This meant that the computer had to be supplied with a special TV, the whole package costing over £1,000. "We did ourselves a considerable dis-service by test-marketing the NTSC version. As a result, when the PAL UK version appeared it was regarded as an old product and has suffered from this image ever since."

In spring 1980, Mike was promoted to take charge of the full range of TI electronic goods. The PAL version of the 99/4 computer arrived in July 1981, quickly followed by the 99/4A in November.

"Christmas '81 was really a trial market for us and we sold out — the machine was then in competition with the Atari 400 and the ZX81 — the Vic20 was talked about but didn't arrive."

So TI entered 1982 with a lot of confidence and, in February, Mike was made managing director. In April, however, much of that confidence evaporated with the announcement of the Sinclair Spectrum. "That machine dramatically reduced the price expectation of the consumer. At that stage we were at £299 and we dropped immediately to £199." By this time the Vic had arrived and that also dropped in price, from £199 to £175.

"Still the 99/4A machine didn't sell in the sort of quantities that Texas wanted, so in the autumn we brought it down to £150 — and that worked! That £50 acted like a step function in consumer demand. All the product for the year was sold out within six weeks."

Mike still feels that the 99/4A machine is very underrated. "It had a Sprite capability three years before the Commodore 64. It has 13 digit precision — very accurate for a home computer — and can handle 3-dimensional arrays. That is really a very high spec."

Mike shrugs. The TI 99/4A is no longer his concern. As the newly appointed managing director of Mattel Electronics (UK), his job is to make sure that the new Aquarius home computer sells.

And he seems to have risen to the challenge. Last month, Sinclair cut the price of his 16K Spectrum to under £100. Mattel has responded by fixing the price of the Aquarius at £89.85 — and that is a price that may be discounted still further.

Clearly, the Z80A-based Aquarius is a competitor for the Spectrum, Oric and Vic. "Quite simply, the Aquarius will be the lowest-cost full colour home computer on the market — and what I mean by that is 16 colours, a 40 x 24 character screen with high resolution graphics and a plug-in cartridge capability," says Mike.

And it does not end there. The Aquarius will be launched with a range of software titles, and add-on accessories. A mini-expander adds two extra sound channels, a pair of games controllers and allows two cartridges to be plugged in simultaneously. For example, it is possible to plug in a 16K Ram expansion memory and the *FinForm* spreadsheet cartridge, itself on 20K Rom. There is also an Aquarius 80-characters per second 40-column thermal printer and a data recorder.

Early next year there will be a Maxi-Expander unit, allowing the memory to be expanded to 52K and twin disc drives to be connected. The disc drives — also available early in 1984 — will be 5¼in and CP/M compatible, making the Aquarius the lowest-priced CP/M machine.

Software-orientated

Mattel, however, remains a software orientated company. "It regards the Aquarius as a machine to run its software," says Mike. "One of the reasons that the Aquarius is so competitively priced is so we can sell our software — but first we must get a broad hardware base."

As Mike says, Mattel is prepared and will develop software for any machine that has a big enough user base. The company has already announced that it will sell material for the Atari, IBM and Apple machines this year, and the Commodore 64 and Texas machines may follow.

Although Mattel will launch its Intellivision add-on computer keyboard — giving it an extra 32K and Basic programming — this year, most eyes will surely be on the Aquarius, to see if it can compete successfully with the Spectrum.

Says Mike: "We are very serious about the product — otherwise we wouldn't have chosen the £89.85 price point.

"The Aquarius is the first of a family of home computers from Mattel where the emphasis will be on upwards compatibility with future generation products." ■



Keep hitting the keys!

***Mike Grace** finds out what life is like on the other side of the Traxx*

Software for the Vic is definitely getting harder Let s start with what is (for me) an absolutely impossible game to master — *Traxx* from Llamasoft This cassette costs £6 00 needs at least 8K expansion, and is infuriating Why do I say this? Because I cannot do it that's why

The game sets up a series of grids on the screen which you need to colour red by moving the joystick (supposedly moving a spaceship which is all the while being pursued by *Bugs* that will destroy you if they catch you) So by moving your ship along up along and down, forming a box, you capture that segment of space But, it isn t as easy as it sounds for if you backtrack or move along too far (exceptionally easy with my joystick), then all your hard-earned effort at tracing red in that particular square is lost

If, by some stroke of luck, you do manage to capture four corner squares then you can eat a few *Bugs*, instead of them eating you, and score some bonus points Needless to say, I haven t managed this feat yet You get a variety of skill levels (81 in all) by varying the speed of play, and the number of nasty bugs chasing you

I may have made it all sound impossibly hard — but this is not so in fact My own children love it, as do their friends, and I find this game to be a firm favourite amongst the younger generation I think it s good value for money — exceptional in fact But it *is* hard

Still smarting from the failure to beat *Traxx* I turned to an adventure game called *Lair* from Soft Toys which costs £6 00 and needs 16K This is slightly different from the other adventures I ve played as you are given a map of various caves The idea is to move around the caves (fighting off various baddies along the way) until you eventually find some treasure Having found it you must solve a few riddles to enable you to bring the treasure out again

The game is dotted with Tolkienesque characters (orcs, sprites balrogs etc) all wanting to do you harm of some sort or other But the orcs carry magic rings which you need to acquire because you cannot get the treasure without at least five rings

Thus the main difference between this and other adventures is that you are really trying to find your way around a series of mazes (drawing you own map is essential) and that you don't really ever have to think too hard to solve a problem All you have to do when faced with a baddy is choose from a selection (a menu, in fact) whether to flee fight, pass trade, or whatever choice you are given

Despite the lack of original thought, I found the game pretty compulsive, but there are a few nasty surprises An example of this is the command *Help*, which will tell you where you are in the maze by displaying a map of the level you are on However when you press *H* for *Help* the map is drawn rather quickly on the screen the symbols are not explained and before I really had a chance to work out what it all meant, the map had gone again leaving me with 17 fewer points for magic

. . . splatted by the wheel of a lorry

Still *Lair* is an exceptionally good game, quite taxing, and I can see I ve got quite a while to go before I solve it so I ll let you find out more about it yourself

But, just before I move on to the next cassette, a final few words about the presentation The game is fairly basic when it comes to packaging (although there is an excellent insert of instructions which explains the principles of playing helpful to the first-time adventurer) Having a birds-eye view of the tunnels does help as you wander through the maze but it also tends to stifle creativity as most of the time your journeys through the endless caves are more a question of not getting lost than in working out problems or solving puzzles

One final feature which is indispensable you can *Save* your game on tape This means that as you progress it s possible to *Save* your initial wanderings and just reload, saving a lot of tiresome time should events cause your sudden demise

After the mind-searching problems of an adventure I settled into another version of *Frogger* this time from Sumlock Electronic Services and called *Jumpin Jack* (interesting how all the different versions of basically the same game come up with a variety of different names isn t it?) Priced at £7 95 (with 50p postage and packing) for the unexpanded Vic, this cassette is attractively packaged with a full-colour picture of a frog being splatted by the wheel of a lorry (in the best of taste I can assure you) and contains adequate instructions on the cassette cover

An interesting sidetrack here is the effort now being made by the software companies to package their products more professionally When I started these reviews it seemed only Commodore really troubled to consider the importance of presentation but now the majority of games are arriving with more care and attention in this aspect of production

Still back to *Jumpin Jack* The blurb on the packet tells me that this game is written entirely in fast machine code with superb sound effects and Hi-res graphics (these are not my phrases) so that we have a game with a quality and presentation normally associated with arcade machines Well, someone should have told them about *Frog Runner* by Anirog (reviewed in *Popular Computing Weekly*, 7 13 April) which costs less and is far superior in every aspect, from the graphics and speed through to the skill required

What *Jumpin Jack* has got is a fairly slow first stage (handy for those who need to build up their skills slowly), which is easy to master Having manoeuvred the frog across the usual road between the traffic (not hard at all) then you wait until you hop onto the logs and turtles to arrive home However, once five frogs are home (you have the customary three lives) the game moves up a notch and now there is a row of fast-moving racing cars to dodge plus fewer logs and turtles

It s quite playable but it seems a little expensive for what it offers as a competitor in the *Frogger* market

Staying with Sumlock for the moment another of its cassettes is *Starship Escape* for the 16K Vic This is a real-time adventure game which isn t really an adventure at all more a test of skill at moving your man about to avoid various hazards

The idea is that you are a lonely astronaut captured by a mysterious alien craft (a good bit of hi-res graphics to display your capture at the start of the game) For some obviously alien reason the baddies take your spaceship to bits and distribute various parts all over their own ship They then put you in the airlock and leave you Your task is to find the various bits of your own craft carry them back to the airlock, and then reassemble them

The only problem is that all over the ship are various alien baddies (varying in speed and hi-res from spiders and androids to a mysterious alien cloud) whose only goal in life seems to be to pick you up and deposit you back in the airlock Quite why they have this hang-up about the airlock is never revealed (alien minds are hard to





fathom I suppose) I found the idea appealing (especially the fact I could stop the clock if I wanted by pressing + and look at a map of the ship to see where I was), but there seemed to be several problems when I got around to playing it

One example was that whenever I pressed the *Fire* button on the joystick to destroy the baddy — nothing happened. As a consequence I was hauled back to the airlock (fairly annoying if you have managed to dodge about 10 aliens successfully and really seem to be getting somewhere at last) and had to start all over again

The graphics are reasonable (I especially liked my little astronaut who had a cute habit of waving his arms around like mad as he ran about the ship trying to find the right part) and as I said I like the concept but I found the game impossible to play because of the fact I could not fire my laser nor could I pick up parts of the ship when I came to them (which should have been possible by pressing the key *J*). Whether this is just a fault in my review copy or whether a fault in my Vic I'm not sure, but anyway it detracted from the enjoyment. This game is priced at £9 95 and is a reasonable price for what it offers.

For sheer joy it's hsrd to beat!

Let's stay with the space scene for the next cassette, *Star Warp II* for the expanded Vic (16K) from Soft Toys and priced at £7 00. Like their other 16K game *The Lair*, this is exceptional value for money. The best way of describing this game is to say it is a blend of *Subspace Striker* and *Star Trek*. And the combination works exceptionally well for we have the skill and interest of *Star Trek* with the graphics and battle skills of *Subspace Striker*

Although I've liked *Star Trek* before, I have felt something to be missing — and now I know what it was. With *Star Warp II* you are the commander of a space ship (you are given the choice at the beginning of choosing one of six different types all with varying values for crew torpedoes, combat, etc, which enables you to try and select a good ship) and you have to jet around the galaxy investigating planets on your way. You have the unusual star bases to replenish your stocks, but unlike *Star Trek* you also have to warp over to planets and land on them, as part of your mission. Whereas in *Star Trek* your mission is to seek out and destroy the Klingons. In *Star Warp II* the baddies seek you out whilst you are exploring

It is in the battle sequences that it starts to get exciting. A ship will appear out of nowhere displayed on the screen and with exotic names like a Kougan Whip Wing or an Indrot Haell Dart and you enter real time for battle. You are given only seconds to decide whether you want to fire torpedoes (by pressing the key *T*) or phasers (by pressing *P*) or retreat (by pressing *R*) and so on. If you don't press you suffer the consequences of enemy fire

The scope of *Star Warp II* is vast. There are 45 sections to the galaxy. Each section can contain anything from two to five stars and each star can have several planets for you to explore. If you survive all the hazards you can refuel and take on new crew at the star bases dotted around and, if you come across a star gate, you can warp onto another sector of space

Star Warp II is excellent value and terrific fun. I can recommend this game for the long winter evenings, providing you like the *Star Trek* concept. Soft Toys seem to be giving good value for money so it was with a little less apprehension than usual that I turned to the last cassette this time around — a compendium from Soft Toys called *Soft Toys 1* and mainly for the unexpanded Vic. This cassette costs £5 00 and contains seven games in all — must be good value even if some of them (as they so often are) aren't too good

This cassette is a mix of the general type of games found on multiple game packages. First is *The Deep*, a simple firing game where you are a submarine lying on the sea bed firing torpedoes at passing ships above you to sink them. Not too difficult (an excellent game for the 5-10 year age group) but the graphics are really something! The submarine looks like a real submarine, the passing ships are of varying shapes and colours and when they are hit a short display of a sunken ship appears briefly. The whole presentation is excellent, although the game itself somewhat limiting

Next is *Killer Park*, needing 3K extra expansion, and what a game this one is — I think of all the games I've played for quite a while this one is the most enjoyable! One seventh of a cheap tape and it gives me more pure fun and enjoyment than all the cartridges and 16K tapes I've reviewed for quite a while. Of course, it hasn't the depth of some of the more expensive games, but for sheer joy it's hard to beat

The essence of the game is simple (aren't the good ones always?) you have to get a little man along a maze to the end. But the problem comes in that as you move him you suddenly and without warning have to take part in another game thrown in at random. This can be *asteroids rhino, laser rays dropping from the sky gobblers*; in fact one of an assortment of very simple and compulsive classics of the micro game stable. Needless to say, if you lose you're taken back to the start.

The rest of the tape contains a version of *Master Mind* called *Code Breaker, Noughts and Crosses, Music Generator, Pontoon*, and *King John* (where you have to estimate the number of tons of corn to plant, eat or feed to the animals to ensure economic survival). This really is an excellent tape, quite a lot of thought has gone into the graphics and presentation of the individual games and it's well worth the price. In fact, Soft Toys has impressed me with its offerings and its interesting to note that the only advertisement I've seen for its products (in *Vic Computing*) looked very amateurish and gives no hint of the excellence of its products

So we're finished with another review. I still cannot do *Traxx*, yet it's the favourite of the bunch for my children (aged 13 nine and five). I'm finding it hard to beat the thing in the *Killer Park* game on *Soft Toys 1*, and the thought of working through 45 sectors of space in *Space Warp II* is formidable (thank heaven it has a save to tape facility). But, despite all that, I still find computer games addictive, infuriating and plain simple fun. I sometimes wonder what it is about them that is so captivating, but that's another symptom of age — what we really need to do is just sit down and enjoy them. So whatever your age out there, keep hitting the keys and moving the joysticks (ouch!) ■

Firm	Program	Price	Value (1-10)
Llamasoft 49 Mount Pleasant Tadley Hants RG26 6BN	*Traxx*	£6 00	6
Sumlock Royal London House 196 Deansgate Manchester M3 3NE	*Jumpin Jack* *Starship Escape*	£7 95 (+p&p) £9 95 (+p&p)	5 6
Soft Toys 14 Lockharton Avenue Edinburgh EH14 1AZ	*The Lair* *Star Warp II* *Soft Toys 1*	£8 00 £7 00 £5 00	8 10 8

Speaks for itself!

***Mark Martin** sounds off about an illustrative program for the Vic20*

'Speaking of' is a quick and easy way to make communication with the user more interesting, especially in a program, like an adventure where many comments or messages need to be printed on the screen It takes up little memory space, just over one kilobyte and does not *Poke* the screen so it will work on unexpanded or expanded Vic20 machines

The program proper starts at line 60000 onwards so it should fit in your program quite happily without interfering with other routines However care is needed to ensure that the variables used in the routine are not repeated within the main program

To make the routine work, assign *X$* with a sentence and *Gosub 60000* (lines 10 to 30 give an example of this and may be deleted if necessary) Each word must be separated by a space (not a shifted space) to make this work and punctuation must be followed by a space

One of the major features of this routine is that a *Bleep* is sounded for each syllable This is far easier than most people think, if you break down a word For example, take the word *Program* It has two syllables thus

PRO/GRAM

Each syllable in the word *Program* has one vowel within it But now about the word *Routine*? This is separated as follows

ROU/TINE

The first syllable has two vowels which are joined in a group As a general rule each syllable has a vowel or a group of vowels By producing a *Bleep* for each vowel or group of vowels the effect of sounding out each syllable is created

Program notes

60000-60090 SEARCH X$ FOR WORD
60100-60310 PRINT HEAD
60320-60400 PRINT WORD AND CHECK FOR VOWELS
60410-60520 PRONOUNCE VOWELS

Variables

M1$ = POSITION CURSOR AT MOUTH
M2$ = POSITION CURSOR AND CLEAR LINE
X$ = MESSAGE TO BE PRINTED
WD$ = WORD FROM X$
ZZ$ = CHARACTER FROM WD$
NX$ = NEXT CHARACTER FROM WD$
SR$ = CHARACTER FROM X$
PO = LAST POSITION OF CURSOR
NT = NOTE TO BE PLAYED
DE = DELAY

```
5 REM BY MARK MARTIN
10 X$="THIS IS AN EXAMPLE OF THE PROGRAM
   'SPEAKING OF' FOR THE VIC"
20 GOSUB60000
30 END
60000 M1$="████████████"
60010 M2$=M1$+"   ████████████"
60020 PRINT"█"
60030 PS=0 PRINTM1$, PO=POS(0)
60040 WD$=""
60050 PS=PS+1 SR$=MID$(X$,PS,1)
      WD$=WD$+SR$
60060 IFPS>LEN(X$)+1THENPRINT"███"
      RETURN
60070 IFSR$<>" "ANDSR$<>""THEN60050
60080 IFPO+LEN(WD$)<21THENGOSUB60320
      GOTO60040
60090 PRINTM2$, PO=POS(0) GOSUB60320
      GOTO60040
60100 PRINT"█ █   █"
60110 PRINT" █    █"
60120 PRINT" █    ."
60130 PRINT" █ /   █"
60140 PRINT" █ \   █"
60150 PRINT" █     "
60160 PRINT" █    -"
60170 PRINT" █    █"
60180 PRINT" █  █"
60190 POKE36878,2 POKE36876,0
60200 RETURN
60210 PRINT"█ █   █"
60220 PRINT" █    █"
60230 PRINT" █    ."
60240 PRINT" █ /   █"
60250 PRINT" █ \    █"
60260 PRINT" █      █ "
60270 PRINT" █    █"
60280 PRINT" █      "
60290 PRINT" █  █"
60300 POKE36878,15 POKE36876,NT
60310 RETURN
60320 GOSUB60100
60330 FORLN=1TOLEN(WD$)
60340 ZZ$=MID$(WD$,LN,1)
60350 NX$=MID$(WD$,LN+1,1)
60360 IFZZ$="A"ORZZ$="E"ORZZ$="I"ORZZ$=
      "O"ORZZ$="U"ORZZ$="Y"THENGOSUB
      60410
60370 PRINTM1$,TAB(PO);ZZ$, PO=POS(0)
60380 NEXT
60390 POKE36878,0 POKE36876,0
60400 RETURN
60410 IFNX$="A"ORNX$="E"ORNX$="I"ORNX$=
      "O"ORNX$="U"ORNX$="Y"THENRETURN
60420 IF(NX$=" "ANDZZ$="E"ANDLEN(WD$)>4)
      THENRETURN
60430 IFZZ$="A"THENNT=180 DE=200
60440 IFZZ$="E"THENNT=195 DE=150
60450 IFZZ$="I"THENNT=210 DE=100
60460 IFZZ$="O"THENNT=200 DE=250
60470 IFZZ$="U"THENNT=180 DE=250
60480 IFZZ$="Y"THENNT=185 DE=200
60490 GOSUB60210
60500 FORX=1TODE NEXT
60510 GOSUB60100
60520 RETURN

READY.
```

Paint it black!

***Ian Logan** presents a series of routines to 'paint' triangles, rectangles and circles*

This article contains a series of Basic programs that explore the 'filling-in' of triangles, rectangles and circles. These programs will be of greatest interest to Spectrum owners but, nevertheless, owners of other microcomputers should find much of interest.

The Spectrum has three commands that can be used to outline a figure:

PLOT x,y – sets a pixel at position x,y

DRAW x,y – sets a line of pixels from the last position to a point x,y distant (The *Draw x,y,z* command that draws curved lines was discussed in *PCW* 12-18 May)

CIRCLE x,y,z – draws a circle with centre x,y and radius z

There are, however, no commands for 'filling-in' areas and such actions have to be programmed — either in Basic or machine code.

First the assumptions. Figure 1 shows a representative triangle. It has an origin, *StartX StartY*, a *height* and a *width*. The triangle is right-angled and is formed to the right hand side of the *Height*.

Fig. 1
A representative triangle

There are several ways in which all the pixels lying within the area of the triangle can be set. The idea of considering all pixels and *Plotting* only those that occur in the triangle is a non-starter, as is the approach of *Drawing* lines radially — very pretty but rather slow.

A better way is to construct the triangle from a series of horizontally *Drawn* lines. The *Drawing* of a line is reasonably fast in the Spectrum and the set of horizontal lines includes all the necessary pixels. The length of a horizontal line is given by the formula:

Width — Steps/Height * Width

where *Steps* is the required line number with the line through the origin being *Step zero*. Figure 2 shows this stage of the discussion.

Fig. 2
A horizontal line in a triangle

The *'Filled-in Triangles'* program shows the finished algorithm. The program allows for triangles to be *Drawn* in any quadrant. Note that the top line, a single pixel, is best considered by itself — and, as written, all triangles are of the same colour.

It is in fact easier to fill-in rectangular areas than to fill-in triangles as the line length will be constant. Again, the origin of the rectangle is taken as *StartX StartY*, and the rectangle has both *Width* and *Height*.

The *Filled-in Rectangles* program shows the full algorithm. This time the figures come in random colours and the user is repeatedly prompted to enter the next rectangle. Care must be taken to ensure that the parameters entered are valid, otherwise the program will stop (see the section on error trapping).

The filling-in of circular areas gives the programmer the chance to develop rather more complicated algorithms. A circle has an origin, *StartX, StartY* and a radius. But there are then many ways in which the lines of the areas can be described.

In the accompanying algorithm the 'length of a line' is found by using simple Pythagorean arithmetic. Then, to save the repeated evaluation of line lengths, the line from the upper semi-circle is reflected to the lower semicircle. Figure 3 illustrates the algorithm.

Fig 3
The horizontal lines of a circle

The *Filled in circles* program shows the complete algorithm. In the program it is the 'square of the radius', *Rad2*, that has to be available throughout. Also note the use of the expression

EXP (1/2*LN (RAD2-Steps*Steps))

as this explains more fully how the Spec-

```
10 REM   FILLED-IN TRIANGLES
20 INPUT "Enter start (X &
   Y)",StartX," ",StartY
30 INPUT "Enter width and
   height ",Width," ",Height
40 LET Steps=Height
50 PLOT StartX,StartY+Steps
60 GO TO 100
70 REM The loop for the lines
80 PLOT StartX,StartY+Steps
90 DRAW Width-Steps/Height*Wid
   th,0
100 IF NOT Steps THEN STOP
110 LET Steps=Steps-(Steps>0)
    +(Steps<0)
120 GO TO 80
```

```
10 REM   FILLED-IN RECTANGLES
20 INPUT "Enter start (X & Y)
   ",StartX," ",StartY
30 INPUT "Enter width and heig
   ht ",Width," ",Height
40 LET Steps=Height
50 LET Col=RND*6.6
60 REM The loop for the lines
70 PLOT INK Col,StartX,StartY+
   Steps
80 DRAW INK Col,Width,0
90 IF NOT Steps THEN GO TO 20
100 LET Steps=Steps-(Steps>0)
    +(Steps<0)
120 GO TO 70
```

trum evaluates its square roots

Once again the user can make the figures appear in different colours or with random sizes

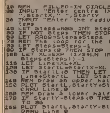
Everyone who has used *Plot Draw* or *Circle* on a Spectrum will have found that an error report is given and the program stops whenever the edge of the tv screen is reached. It is, however, possible to trap this situation by altering the system variable *Err—Sp* and thereby continue with the program

The system variable *Err—Sp* is the pointer to the return address *1303h* that, if acted upon, returns the interpreter to the main execution loop and produces an error report. The address on the machine stack below the *1303h* (ie, added later) is the address *Stmt—Ret 1B76h*, that always leads to the next statement being considered by the operating system

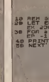
In the case of an error occuring that the user wishes to trap, then it is a straightforward matter to surround the error-giving statement with the necessary statements to change the value of *Err—Sp* (*Err—Nr* needs resetting also as 'no error' has occured). The program *Showing Err—Sp* illustrates these addresses on the machine stack

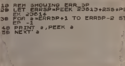
As a suggested protocol, the program *Error Trapping* gives the necessary steps. The flag, *F*, becomes set only when an 'error' has been trapped

This article has tried to give the reader a few ideas that can be developed. The *Finale* program has been written not to develop any new material, but only to consolidate the concepts that have been mentioned. The *Finale* program is a 'sit & watch' program and I hope that you like it — please find yourself a colour tv for it! ●

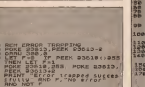


```
10 REM    FILLED-IN CIRCLES
20 INPUT "Enter centre (X & Y)
   ",StartX," ",StartY
30 INPUT "Enter the radius ";S
   teps
40 LET Steps=ABS INT Steps
50 IF NOT Steps THEN STOP
60 LET RAD2=Steps*Steps
70 REM The loop for the lines
80 LET Steps=Steps-1
90 IF Steps<0 THEN STOP
100 LET XL=EXP (1/2*LN (RAD2-
    Steps*Steps))-1
110 LET Line=XL+XL
120 LET StartL=StartX-XL
130 IF StartL<0 THEN LET Line=
    Line+StartL: LET StartL=0
140 REM Draw an upper halfline
150 PLOT StartL,StartY+Steps:
    DRAW Line,0
160 REM Draw a lower half line
170 IF StartY-Steps<0 THEN GO
    TO 80
180 PLOT StartL,StartY-Steps:
    DRAW Line,0
190 GO TO 80
```

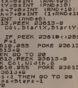




```
10 REM SHOWING ERR_SP
20 LET ERRSP=PEEK 23613+256*PE
   EK 23614
30 FOR a=ERRSP+1 TO ERRSP-2 ST
   EP -1
40 PRINT a,PEEK a
50 NEXT a
```



```
10 REM ERROR TRAPPING
20 POKE 23613,PEEK 23613-2
30 DRAW 300,0
40 LET F=0: IF PEEK 23610<>255
   THEN LET F=1
50 POKE 23610,255: POKE 23613,
   PEEK 23613+2
60 PRINT "Error trapped succes
   sfully" AND F,"No error"
   AND NOT F
```



```
10 REM    FINALE...
20 LET StartX=8*INT (RND*25)
30 LET StartY=8*INT (RND*18)
40 LET Steps=7+8*INT (RND*10)
50 LET Width=7+8*INT (1+RND*15
60 LET Col=INT (RND*8)
70 POKE 23613,PEEK 23613-2
80 PLOT INK Col,StartX,StartY+
   Steps
90 LET F=0: IF PEEK 23610<>255
   THEN LET F=1
100 POKE 23610,255: POKE 23613,
    PEEK 23613+2
110 IF F THEN GO TO 20
120 POKE 23613,PEEK 23613-2
130 DRAW INK Col,Width,0
140 POKE 23610,255: POKE 23613
    ,PEEK 23613+2
150 IF Steps<1 THEN GO TO 20
160 LET Steps=Steps-1
170 GO TO 70
```

Shifting sands . . .

Peter Chase presents a series of machine code scrolling routines

This is the last in my series on machine code for the Dragon — it deals with scrolling and shifting blocks of memory. All the routines can be used by Basic or assembly language programs.

Listing One contains three routines that can perform most shifts and scrolls. *@UL* shifts a block of memory *Length*2* bytes long that starts at *From* to the block starting at *TO*. As it starts shifting at the lowest address (*From*) it is used to scroll either left or up.

@DR shifts a block of memory *Length*2* bytes long that ends at *From* to the block ending at *To*. It shifts from the highest address and is used to scroll right or down.

@BLANK is not a shift routine. It stores the byte in *CHARACTER* in *COLUMNS* seperate addresses starting at *FIRST* with a gap between addresses *GAP*. It has a number of uses including clearing small areas of screen, cleaning memory and, most importantly, stopping wrap around in horizontal scrolls (wrap around is the effect when the far edge of the screen appears on the other side after scrolling).

All the variables I have mentioned (in capitals so far) are stored in addresses *&H7FF0* to *&H7FFB*. By altering these, most scrolls can be performed. Table one gives examples of suitable values to assign to the variables while Listing Two shows how to enter the values in a Basic program to produce, for example, upward text scrolling.

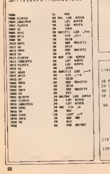
Listing Three is a very simple demonstration game, using one scrolling routine and the *@Blank* routine. You use the up and down arrow keys to avoid the advancing coloured blocks. Such a game should be written in machine code, to match the speed of the scrolling routine, but Basic is used here for conciseness.

Notice that the game displays 10 colours on the screen at once, not the claimed nine. In fact, the Dragon has 12 colours (the extras are light orange, dark red and deep green) and 11 can be displayed at one time on a text or mode 24 screen without using machine code. ■

TABLE ONE

Scroll	'LENGTH' &H7FF0		'FROM' &H7FF2		'TO' &H7FF4		FIRST &H7FF6		'CHARACTER' &H7FF8	GAP &H7FF9	COLUMNS &H7FFA		EXEC
Text Up	0	240	4	32	4	0							@ UL only
Text Down	0	240	5	223	5	255							@ DR only
Text Left	1	0	4	1	4	0	4	31	32*	32	0	18	@ UL (+ @ BLANK)
Text Right	1	0	5	254	5	255	4	0	32*	32	0	16	@ DR (+ @ BLANK)
PMODE 0 — Up	2	240	6	16	6	0							@ UL only
PMODE 0 — Down	2	240	11	239	11	255							@ DR only
PMODE 1 or 2 UP	5	240	6	32	6	0							@ UL only
etc													

All values decimal unless stated otherwise.
*Or other appropriate character.

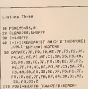


Listing One-Memory Shift(scroll)Routines

```
7000                    ORG
7000 FC7FF0      @UL    LDD   &H7FF0
7003 10BE7FF2           LDY   &H7FF2
7007 FE7FF4             LDU   &H7FF4
700A 4C                 INCA
700B AEA1        @UL1   LDX   ,Y++
700D AFC1               STX   ,U++
700F 5A                 DECB
7010 26F9               BNE   @UL1
7012 4A                 DECA
7013 26F6               BNE   @UL1
7015 39                 RTS
7016 FC7FF0      @DR    LDD   &H7FF0
7019 10BE7FF2           LDY   &H7FF2
701D FE7FF4             LDU   &H7FF4
7020 4C                 INCA
7021 AEA3        @DR1   LDX   ,--Y
7023 AFC3               STX   ,--U
7025 5A                 DECB
7026 26F9               BNE   @DR1
7028 4A                 DECA
7029 26F6               BNE   @DR1
702B 39                 RTS
702C BE7FF6      @BLANK LDX   &H7FF6
702F FC7FF8             LDD   &H7FF8
7032 10BE7FFA           LDY   &H7FFA
7036 A784        @BL    STA   ,X
7038 3A                 ABX
7039 31A2               LEAY  ,-Y
703B 26F9               BNE   @BL
703D 39                 RTS
703E                    END   @START
```

Listing Two

```
20 CLEAR200,&H6FFF
30 I=&H6FFF
40 I=I+1:READA$:IF A$<>"Z"THENPOKEI,VAL(
"&H"+A$):GOTO40
50 DATAFC,7F,F0,10,BE,7F,F2,FE,7F,F4,4C,
AE,A1,AF,C1,5A,26,F9,4A,26,F6,39,FC,7F,F
0,10,BE,7F,F2,FE,7F,F4,4C,AE,A3,AF,C3,5A
,26,F9,4A,26,F6,39,BE,7F,F6,FC,7F,F8,10,
BE,7F,FA,A7,84,3A,31,A2,26,F9,39,Z
110 FORI=&H7FF0 TO&H7FF5:READA:POKEI,A:N
EXT
120 DATA0,240,4,32,4,00
130 FORI=1TO100:EXEC&H7000:NEXT
140 PRINT"SCROLLING":GOTO130
```



Listing Three

```
10 POKE65495,0
20 CLEAR200,&H6FFF
30 I=&H6FFF
40 I=I+1:READA$:IF A$<>"Z"THENPOKEI
   ,VAL("&H"+A$):GOTO40
50 DATAFC,7F,F0,10,BE,7F,F2,FE,7F,
   F4,4C,AE,A1,AF,C1,5A,26,F9,4A,
   26,F6,39,FC,7F,F0,10,BE,7F,F2,
   FE,7F,F4,4C,AE,A3,AF,C3,5A,26,
   F9,4A,26,F6,39,BE,7F,F6,FC,7F,
   F8,10,BE,7F,FA,A7,84,3A,31,A2,
   26,F9,39,Z
110 FORI=&H7FF0 TO&H7FFB:READA:
    POKEI,A:NEXT
120 DATA1,240,4,1,4,0,4,31,32,
    32,0,17
130 FORI=1TO100:EXEC&H7000:
   EXEC&H702C:NE
XT:POKE65495,0
140 P=1056
150 SCREEN0,1
160 EXEC&H7000
170 POKEP,159:POKEP-32,159:
    POKEP+32,159
180 EXEC&H702C
190 IFPEEK(P+1)>128ORPEEK(P-31)>
    128ORPEEK(P+33)>128THENCLS:
    POKE65494,0:END
200 K$=INKEY$:P=P-32*(P<1470ANDK$=
    CHR$(10))+32*(P>1056ANDK$=CHR$(1
    CHR$(94))
210 S=S+1:IFRND(1000)>S THEN230
220 POKE1055+32*RND(15),127+RND(8)
    *16
230 POKEP,32:POKEP-32,32:POKEP+32,
    32:GOTO160
```



Allows you to use any Atari/Commodore type Joystick with the Spectrum. Simply plugs into the Spectrum. Complete with 12 months' guarantee

JOYSTICK COMPATIBLE SOFTWARE FROM

KEMPSOFT

FOR THE SPECTRUM

ORDER NOW!

☐ Astro Blaster	16K Quicksilva	£4·95	
☐ Blind Alley	16K Sunshine	£4·95	
☐ Cosmic Guerilla	16K Crystal	£5·95	
☐ Cosmos	16K Abbex	£5·95	
☐ Cyber Rats	16K Silversoft	£5·95	
☐ ETX	16K Abbex	£5·95	
☐ Frenzy	16K Quicksilva	£4·95	
☐ Frogger	16K DJL	£5·95	
☐ Galaxians	16K Artic	£4·95	
☐ Gulpman	16K Campbell Sys.	£4·95	
☐ Jet Pac	16K Ultimate	£5·95	
☐ Joust	16K Softek	£5·95	
☐ Knot in 3D	48K New Gen	£5·95	
☐ Mazeman	16K Abersoft	£5·95	
☐ Meteoroids	16K Softek	£4·95	
☐ Night Flite	16K Hewson Cons	£5·95	
☐ PSSST	16K Ultimate	£5·95	
☐ 3D Tunnel	16/48K New Gen	£5·95	
☐ Time Gate	48K Quicksilva	£6·95	
☐ Slippery Sid	16K Silversoft	£5·95	
☐ Spookyman	16K Abbex	£4·95	
☐ Conversion Tape I	Kempsoft	£4·95	
☐ Conversion Tape II	Kempsoft	£4·95	
☐ Spectrum Joystick interface only £15·00			

Please tick appropriate boxes.
Prices include P&P and VAT. Overseas prices add £4·00 P&P. Total £

Cheques/Postal Orders should be made payable to Kempston (Micro) Electronics Ltd.

Name ________ Signature ________

Address ________

Please debit my Access/Visa* Account No

*Delete as applicable

Kempston (Micro) Electronics Ltd, Dept
180a Bedford Road, Kempston, Bedford MK42 8BL. PCW15

DRAGON SOFTWARE all machine code

VULTURES — NEW (uses one joystick)
FAST MOVING GALAXIAN TYPE GAME in full colour with Hi Res graphics and colour. A flock of vultures guard their eggs. As they swoop towards you try to kill them, but watch out. Just when you think you have killed them all, the eggs hatch!
SUPPLIED ON CASSETTE £6.95

DGT2
THREE Fast moving Arcade style games in full colour with Hi Res graphics and sound. "Very addictive ... any single one of them is worth a fiver so £6.95 for all 3 is a bargain" (From PCW Review) SNAKES, LANDER and INVADERS. (No joysticks)
3 ON ONE CASSETTE £6.95

EDITOR ASSEMBLER + MONITOR
Two Pass Globe type. Supports standard Motorola mnemonics and Addressing Modes. Powerful Debug Monitor. Recommended for the serious user.
SUPPLIED ON CASSETTE WITH USER INFORMATION £20.70

DISASSEMBLER
Written in position independent Machine Code, will run anywhere in RAM. The ideal aid to Rom around.
SOLD ON CASSETTE £11.86

SPECIAL OFFER
Buy Editor Assembler and Disassembler together and have £5 off.
Cost of both as one purchase £25.00

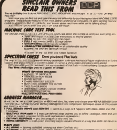
Cheques/POs payable to
J. MORRISON (MICROS) LTD. (PCW3)
2 Glenesk Street, Leeds LS9 9JJ
ALL ORDERS DESPATCHED BY RETURN FIRST CLASS POST
Callers and Trade enquiries welcome.
Tel (0532) 480987

BONKA
ADDICTIVE Arcade style game in full colour. Climb the ladders and dig them to trap the Meanies before they kill you. 4 selectable speeds and choice of 1 to 8 Meanies to start. NO JOYSTICKS NEEDED
SUPPLIED ON CASSETTE £7.95

DGT4
THREE arcade style games with Hi Res graphics and colour.
PTERODACTYL, TORPEDO RUN and HORNETS. NO JOYSTICKS NEEDED
Excellent value for money
3 ON ONE CASSETTE £6.95

CHESS
Hi Res display of board and pieces. 8 selectable levels of skill. CURSOR control move selection (No numbers/letters to enter). Supports CASTLING and EN PASSANT
SUPPLIED ON CASSETTE £7.95

J. MORRISON (MICROS)



Turning turtle . . .

Boris Allan looks at the ins and outs of turtle graphics

Turtle graphics have a long history in mathematics (in the guise of polar geometry and vector algebra) but have been developed as a programming tool and teaching aid by Seymour Papert and co-workers at Massachusetts Institute of Technology

These routines can be used by pupils to investigate vector/polar geometry but will probably find greatest use as the basis of systems which are rather more user-friendly The language Logo (of increasing prominence in primary education) uses a special version of turtle graphics and can be connected to a robotic turtle — it is not difficult to use my *Turgra* routines as the basis for a Logo-type emulator in BBC Basic As the UCSD Pascal system also uses turtle graphics, but non-interactively, I have given equivalents of all the UCSD commands (plus certain others) *Turgra* however can be used interactively

The "Turtle" in turtle graphics is an imaginary beastie which faces in a certain direction (*Angle* in the program) It has certain co-ordinates (*X* and *Y*), and drags a pen which can either be up or down (eg, *Move* or *Draw*) The Turtle starts at the centre, facing up the display screen In program order the routines are

+ *Procirscr* which clears the graphic screen and the next screen
+ *Proccig* sets the graphics foreground, and background, colours (*Pen* is normally 0) The graphics screen is set to leave a space at the bottom (*Vdu 24*) the screen is cleared (*CLG*), and the origin is set at the centre (*Vdu 29*)
+ *Proccls* sets the text colours (to the reverse of the graphics colours), sets the text screen to four lines at the bottom, and clears the new text screen
+ *Proccol* is a procedure which allows the user to set the colour of the Turtle s pen (0 is black, and 1 is white) though this is rarely used by the user
+ *Proccentre* resets the Turtle to the centre facing upwards
+ *Procrestart* clears the graphics and re-centres without affecting the text space
+ *Procstart* uses *Pencol* to set the pen colour to black clears both the graphics screen and the text screen and re-centres
+ *Procinvert* changes the pen colour from black to white (and vice versa), without changing the graphics background — this is used for drawing over previous lines
+ *Proctum* turns the Turtle through *A* degrees, where a positive value is counter-clockwise, and a negative value is clockwise, and the resulting direction (always between 0 and 359) is saved as *Angle*
+ *Procturnto* turns the Turtle to that angle (again normalised by *Fnangle*)
+ *Procloc* is an environmental enquiry which gives the user the co-ordinates and orientation of the Turtle
+ *Procmove* moves the Turtle forward by *Distance* in the present direction Whether the pen draws or not is set by *Style* — if *Style* is 1 then the line is drawn otherwise the pen is moved without drawing
+ *Procmoveto* is a move to a specified pair of co-ordinates, also finding the required angle
+ *Fnangle* takes an input and returns a value between 0 and 359
+ *Procnew* clears the screen, by re-setting the cursor and clearing the screen

The routines are designed to be used in *Mode 4* so before using the routines the mode needs setting (eg, by typing in *Mode 4* in instant mode)

It is worth experimenting with the procedures to get a feel for them A good one to try is

```
PROCSTART PROCMOVE(200 1)
PROCTURN(90) PROCMOVE(200 1)
PROCTURN(90) PROCMOVE(200 1)
PROCTURN(90) PROCMOVE(200 1)
```

and various other little exercises It is also easy to produce a procedure to draw a square

```
3000 DEF PROCSQUARE(S)
3010 LOCAL I  FOR I=1 TO 4
3020 PROCMOVE(S 1)  PROCTURN(90)
3030 NEXT I
3040 ENDPROC  REM SQUARE
```

and to produce squares of different sizes, try some random values and turns eg

```
4000 DEF PROCCIRCLE
4010 LOCAL I  FOR I=1 TO 200
4020 PROCMOVE(5 1)  PROCTURN(1)
4030 NEXT I  ENDPROC  REM CIRCLE
```

■

```
1000REM-------------------------------
1010REM-------------------------------
1020REM
1030REM
1040REM TURTLE-GRAPHICS ROUTINES
1050REM
1060REM
1070REM (c) BORIS ALLAN, 1983
1080REM
1090REM
1100REM
1110REM-------------------------------
1120REM-------------------------------
1130DEF PROCCLRSCR
1140PROCCLS: PROCCLG
1150ENDPROC : REM CLRSCR
1160REM-------------------------------
1170REM-------------------------------
1180DEF PROCCLG
1190GCOL0,PEN:GCOL0,128-PEN
1200VDU24,0;128;1279;1023;
1210CLG
1220VDU29,640;566;
1230ENDPROC : REM CLG
1240REM-------------------------------
1250REM-------------------------------
1260DEF PROCCLS
1270COLOUR 1-PEN: COLOUR128+PEN
1280VDU28,0,31,39,28:CLS
1290ENDPROC : REM CLS
1300REM-------------------------------
1310REM-------------------------------
1320DEF PROCCOL(PE)
1330PEN=PE
1340ENDPROC : REM COL
1350REM-------------------------------
1360REM-------------------------------
1370DEF PROCCENTRE
1380MOVE0,0:ANGLE=0: X=0:Y=0
1390ENDPROC : REM CENTRE
1400REM-------------------------------
1410REM-------------------------------
1420DEF PROCRESTART
1430PROCCLG: PROCCENTRE
1440ENDPROC : REM RESTART
1450REM-------------------------------
1460REM-------------------------------
1470DEF PROCSTART
1480PROCCOL(0): PROCCLRSCR:
    PROCCENTRE
1490ENDPROC : REM START
1500REM-------------------------------
```

Continued on page 27

```
1510REM---------------------------
1520DEF PROCINVERT
1530PEN=1 - PEN: GCOL 0,PEN
1540ENDPROC : REM INVERT
1550REM---------------------------
1560REM---------------------------
1570DEF PROCTURN(A)
1580ANGLE=FNANGLE(ANGLE+A)
1590ENDPROC : REM TURN
1600REM---------------------------
1610REM---------------------------
1620DEF PROCTURNTO(A)
1630ANGLE = FNANGLE(A)
1640ENDFROC : REM TURNTO
1650REM---------------------------
1660REM---------------------------
1670DEF PROCLOC
1680PRINT"COORDINATES ARE ";X,Y'
   "ANGLE IS ";ANGLE
1690ENDPROC : REM LOC
1700REM-- ------------------------
1710REM---------------------------
1720DEF PROCMOVE(DISTANCE,STYLE)
1730LOCAL XC,YC
1740XC=DISTANCE*SIN(RAD(ANGLE)):
   YC=DISTANCE*COS(RAD(ANGLE))
1750X=X-XC : Y=Y+YC
1760IF STYLE=1 THEN DRAW X,Y ELSE
    MOVE X,Y
1770ENDPROC : REM MOVE
1780REM---------------------------
1790REM---------------------------
1800DEF PROCMOVETO(XN,YN,STYLE)
1810LOCALXDIF,YDIF: XDIF=XN-X:
    YDIF=Y-YN
1820IF YDIF<>0 THEN PROCTURNTO(DEG(
    ATN(XDIF/YDIF))+180*(YN<Y
    )) ELSE PROCTURNTO(SGN(-XDIF)
    *90)
1830X=XN : Y=YN
1840IF STYLE=1 THEN DRAW X,Y ELSE
    MOVE X,Y
1850ENDPROC : REM MOVETO
1860REM---------------------------
1870REM---------------------------
1880DEF FNANGLE(A)
1890IF A>0 THEN =A MOD 360 ELSE =A
    MOD 360 +360 : REM ANGLE
1900REM---------------------------
1910REM---------------------------
1920DEF PROCNEW
1930VDU26: CLS
1940ENDPROC : REM NEW
1950REM-- ---------- -------------
1960REM---------------------------
```

Open Forum is for you to publish your programs and ideas. Take care that the listings you send in are all bug-free. Your documentation should start with a general description of the program and what it does and then give some detail of how the program is constructed. We will pay the *Program of the Week* double our new fee of £6 for each program published.

Invaders

on Vic20

This is an invader-type game. Full instructions are included in the program. If it is too hard or too easy then the amount of time between each jump is easily changed. This is done by changing the number in line 502 (smaller makes it harder and bigger makes it easier). The program uses 95 percent of the memory available on the standard machine and it should be a simple job to convert to joystick.

Program notes

Lines	
5-160	Give instructions
170-235	Set up game
240-280	Movement of man + access to bird's movement
300-350	Man fires
500-540	Move seahawk (left/right)
550-570	Move seahawk down
600-660	Seahawk fires
900-910	Add to score + place new seahawk on the screen
1000-1090	User definable graphics
2000-2010	Take of life when hit + when no lives left goto the end
2020-2150	Finish game + print comment on score + print high score

```
5 PRINT"♥" HI=0 G=0
10 POKE36879,230OR126
30 PRINTTAB(7) SEAHAWK"
40 PRINTTAB(7)"-------"
45 PRINT
50 PRINT"KILL THE SWOOPING      SEAHAWK!BUT BE
   WARNED OUT OF ITS DEATHPLACE WILL
60 PRINT"COME  ANOTHER."
65 PRINT"
70 PRINT WATCH OUT FOR ITS DD'S(DEADLY DROPPINGS)
   GET HIT 3 TIMES AND YOU'REDEAD"
75 PRINT
80 PRINT"WHEN IT GETS TO THE   BOTTOM YOU'RE
   KILLED  AS WELL!!
90 PRINT  HIT ANY KEY !        ",
91 POKE198 0 WAIT198,1 POKE198,0
100 PRINT "
101 PRINT YOU DO HAVE ONE THING ON YOUR SIDE YOU
    CAN  FIRE BACK AT IT WITH  YOUR ARROWS."
102 PRINT"YOU HAVE AN UNLIMITED SUPPLY OF THESE."
103 PRINT PRINT
105 PRINT THE CONTROLS ARE  -"
110 PRINT F -FIRES THE ARROW"
120 PRINT" -MOVES TO THE LEFT"
130 PRINT". -MOVES TO THE RIGHT"
135 PRINT PLEASE WAIT!!"
140 GOTO1000
150 PRINT"PRESS ANY KEY TO START",
160 POKE198 0 WAIT 198,1 POKE198,0
170 LI=3 SC=0
180 PS=7712 MA=8130
190 PC=38432 MC=38850
195 PRINT "
200 POKE36879,25
210 FORI=0TO43 POKE8142+I,63 POKE38862+I,3 NEXT
220 POKEPS,59 POKEPS+1,60 POKEPC,2 POKEPC+1,2
230 POKEMA 61 POKEMC,6
235 PRINT" SC,              ,LI
236 POKEMB 32
240 A=PEEK(197)
250 IFA=29THENMA=MA-1 MC=MC-1 POKEMA+1,32 IFMA<=
    8120THENMA=8120 MC=38840
260 IFA=37THENMA=MA+1 MC=MC+1 POKEMA-1,32 IFMA>=
    8141THENMA=8141 MC=38861
265 IFA=42THENGOTO300
270 POKEMA,61 POKEMC 6
275 GOTO500
280 GOTO235
300 M1=MC-22 MB=MA-22
305 M1=M1-22 MB=MB-22
310 POKEMB+22 32 POKEMA 61
320 POKEMB 30 POKEM1 0
330 IFPEEK MB-22)>=59THENGOTO900
340 IFMB<=7724THENGOTO275
350 GOTO305
500 A=INT RND(1)*2)+1
501 G=G+1
502 IFG=10THENGOSUB550
510 IFA=1THENPS=PS+1 PC=PC+1 POKEPS-1,32 IFPS=
    7723THENPS=7722 PC=38442
520 IFA=2THENPS=PS-1 PC=PC-1 POKEPS+2,32 IFPS=
    7702THENPS=7703 PC=38423
530 POKEPS,59 POKEPS+1,60 POKEPC,2 POKEPC+1,2
534 B=RND(1)
535 IFB>.9THENGOTO600
540 GOTO280
550 G=0
555 PC=PC+22
560 PS=PS+22 POKEPS-22,32 POKEPS-21,32 POKEPS,59
    POKEPS+1,60
565 POKEPC,2 POKEPC+1,2
566 IFPS=>8120THENGOTO2020
570 RETURN
600 PB=PS+22 P1=PC+22
610 PB=PB+22 P1=P1+22
620 POKEPB-22,32 POKEPB,59
630 POKEPB 62 POKEP1,7
640 IFPB>=8142THENPOKEPB,32 POKEPB,63 POKEP1,3
    GOTO280
650 IFPEEK(PB+22)=61THENLI=LI-1 GOSUB2000 GOTO280
660 GOTO610
900 R=INT(RND(1)*3)+1 PS=PS+R PC=PC+R SC=SC+1
901 POKEPS,59 POKEPS+1,60 POKEPC,2 POKEPC+1,2
    POKEMB 32 POKEPS-R,32 POKEPS-R+1,32
902 POKE36878 15 POKE36877,250 FORI=1TO250
    NEXT POKE36877 0
910 POKE36878 0 GOTO235
1000 POKE52,28 POKE56,28 CLR
1010 FORI=7168TO7679 POKEI,PEEK(I+25600) NEXT
1020 POKE36869,255
1025 A=7640
1030 FORI=ATOA+39 READU POKEI,U NEXT
1040 DATA57,23 15,7,3,3,7 5
1050 DATA156 104,240,224,132,192,224,160
1060 DATA0 36 36,60,24,24,126,102
1070 DATA0,24,80,118,60,24 0,0
1080 DATA255,255 255,255,255,255,255,255
1090 GOTO150
2000 FORI=255TO200STEP-1 POKE36878,15 POKE36877,I
     NEXT POKE36878,0 POKE36877,0
2005 POKEPB 32
2006 IFLI=0THEN2020
2010 RETURN
2020 PRINT"SORRY THE SEAHAWKS    HAVE DONE AND
     GOT YOU"
2030 PRINT YOU MANAGED TO KILL",SC
2040 PRINT SEAHAWKS.
2045 IFSC=HIGOTO2085
2050 IFSC>HITHENPRINT"YOU'RE THE NEW  SEA-
     HAWK CHAMPION KILLER  HI=SC GOTO2090
2060 IFSC=0THENPRINT"YOU'RE PATHETIC !!  GOTO2100
2070 IFSC<HI/2THENPRINT NOT VERY GOOD" GOTO2100
2080 IFSC>HI/2THENPRINT NOT BAD" GOTO2100
2085 IFSC=HITHENPRINT JOINT CHAMP!!  SC=HI N$=J$
2090 INPUT YOUR NAME CHAMP ,N$
2100 PRINT"PRESENT CHAMP IS  ;N$
2105 PRINT CHAMPS SCORE IS ",HI
2110 PRINT DO YOU WISH TO PLAY   AGAIN (Y/N)!!
2120 DEIA$ IFA$=  THEN2120
2130 IFA$="Y"THENGOTO170
2140 IFA$= N THENPRINT " END
2150 GOTO2120
```

Invaders
by Paul Hampson

Stories

on Dragon 32

This is a word game. You are given a choice of three basic stories from which to choose.

You are then asked for various words according to different parts of speech — noun, verb etc.

You will then see the story you have created on the screen. The program form is very simple and self-explanatory.

```
1 '*******************************
2 '*****      STORIES      *****
3 '*****    BY J HUGHES    *****
4 '*******************************
5 CLS
6 PRINT:PRINT:PRINT"*******************************"
7 PRINT"THE COMPUTER WILL ASK YOU TO    INPUT A KIND OF WORD."
8 PRINT"PUT IN YOUR WORD AND PRESS ENTERAFTER ALL YOUR WORDS
  HAVE BEEN  INPUT YOUR STORY WILL COME UP   ON THE SCREEN "
9 PRINT"*******************************"
10 PRINT :PRINT"PRESS ANY KEY TO START"
11 A$=INKEY$:IF A$=""THEN11
12 CLS:PRINT:PRINT"(1) CREATURES":PRINT"(2) SHAKESPEAR":
   PRINT"(3) LETTERS"
13 PRINT:PRINT"INPUT YOUR NUMBER AND ENTER IT "
14 INPUTB:ON VAL(B$)GOTO15,30,60
15 CLS
16 PRINT:PRINT:INPUT"COLOUR : ";A$
17 INPUT"VERB : ";B$
18 INPUT"GROUP WOBBLES CROWD : ";C$
19 INPUT"PART OF THE BODY : ";D$
20 INPUT"PLURAL NOUN : ";E$
21 INPUT"SHORT ANIMAL : ";F$
22 INPUT"A CREATURE : ";G$
23 INPUT"NUMBER+MEASUREMENT            (EG. 1 FOOT) : ";H$
24 INPUT"VERB : ";I$
25 INPUT"PART OF THE BODY : ";J$
26 INPUT"LIQUID : ";K$
27 INPUT"PLURAL NOUN : ";L$
28 GOSUB78
29 CLS
30 PRINT A$;"'S ARE "B$" AND ROUGHLY" PRINT C$" IN SIZE."
31 PRINT" THEY LIKE TO "D$" VERY" PRINT"QUICKLY RATHER THAN "E$
32 PRINT" THEY MAY SOMETIMES BE FOUND IN":PRINTF$;"'S ON THE "G$"
   OR AT ":PRINT" THE BASE OF THE "H$
33 PRINT" THEY ARE "I$" SUCKING CREATURES":PRINT"LIKES  THE CODS ARE
   LAID ON" PRINT J$" BEFORE THEY HATCH TO ":PRINT"FORM IMMATURE "
   K$'S WHICH":PRINT"IN TURN BECOME ADULT "L$"S"
34 A$=INKEY$:IF A$=""THEN34
35 GOTO5
36 CLS
37 PRINT:INPUT"NAME : ";A$
38 INPUT"NATIONALITY : ";C$
39 INPUT"NAME : ";B$
40 INPUT"PART OF THE BODY : ";D$
41 INPUT"NOUN : ";E$
42 INPUT"NOUN : ";F$
43 INPUT"NATIONALITY : ";G$
44 INPUT"NOUN : ";F$
45 INPUT"NAME : ";H$
46 INPUT"SOMETHING YOU WEAR : ";I$
47 GOSUB78
48 PRINT"PISTOL--WHAT IS THE NEWS?":PRINT"KING--";A$" LE "B$
49 PRINT"PISTOL--LE "B$"; A "C$" ARE?"
50 PRINT"KING--NO, I AM A "D$" MAN."
51 PRINT"PISTOL--KNOW'ST THOU "E$
52 PRINT"KING--YES"
53 PRINT"PISTOL--TELL HIM I'LL KNOCK HIS":PRINT"    "F$" ABOUT HIS "G$
54 PRINT"    UPON SAINT "H$"; S DAY"
55 PRINT"KING--DO NOT WEAR YOUR "I$
56 PRINT"    IN YOUR "J$" THAT DAY ":PRINT"LEST HE KNOCK THAT ABOUT
   YOURS "
57 A$=INKEY$:IF A$=""THEN57
58 GOTO5
59 CLS
60 PRINT:INPUT"MAKE UP A WORD : ";A$
61 INPUT"TECHNICAL WORD : ";C$
62 INPUT"NUMBER : ";E$
63 INPUT"LENGTH OF TIME(EG DAYS)";D$
64 INPUT"PLURAL NOUN : ";I$
65 INPUT"PART OF AN ENGINE : ";B$
66 INPUT"NUMBER : ";C$
67 INPUT"NOUN : ";F$
68 INPUT"SPEECH WORD(EG ANGRY)";H$
69 GOSUB78
70 PRINT:PRINT:PRINT"     DEAR SIR,"
71 PRINT"              I HAVE RECENTLY ":PRINT"BOUGHT A "A$" HOME
   COMPUTER":PRINT"SYSTEM, BUT FIND THAT THE ":PRINTB$" "C$; S ARE
   FAULTY "
72 PRINT" IT IS A "D$"K SYSTEM WHICH":PRINT"I BOUGHT FOR "E$" POUNDS."
73 PRINT" I THINK IT MAY HAVE BECOME":PRINT"FAULTY AFTER THE "F$" FELL"
74 PRINT"AS IT  ALSO I WOULD LIKE TO ":PRINT"START A CLUB FOR THOSE
   OWNERS OF";PRINTA$" COMPUTERS, WE COULD ":PRINT"GET TOGETHER EVERY
   "G$:PRINT"AND "H$" ABOUT OUR "I$
75 A$=INKEY$:IF A$=""THEN75
76 GOTO5
77 END
78 CLS:PRINT@229,"YOUR STORY IS COMING UP":PLAY"ABEFG":CLS:RETURN
```

Stories
by J Hughes

Mathematica

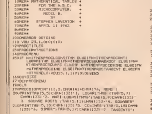
on BBC

This program, for any BBC computer, allows the user to obtain mathematical figures for logarithms, anti-logarithms, square-roots, squares, sines, cosines and tangents.

If any incorrect input is made, control is transferred back to the menu. Figures are given to eight decimal places and very small or very large numbers are presented in exponential form.

Extensive use is made of the procedure capability of the Beeb, an excellent feature which allows programs to be structured.

Possible alterations could be made to the functions calculated. For instance, there is no provision at the moment for secants, log-sines, etc.



```
10REM* MATHEMATICAL TABLES *
20REM*    FOR THE B.B.C.    *
30REM*    MICROCOMPUTER.    *
40REM*       MODEL B.       *
50REM*          BY          *
60REM*   STEPHEN LAVERTON   *
70REM*    APRIL 11 1983     *
80REM*
90REM*
100ONERROR GOTO140
110 VDU 23,1,0;0;0;0;
120PROCTITLES
130PROCINSTRUCTIONS
140PROCMENU
150IF N=1THENPROCLOGARITHM ELSEIFN=2THENPROCANTI
    LOGARITHM ELSEIFN=3THENPROCSQUAREROOT ELSEIFN=
    4THENPROCSQUARE ELSEIF N=5THENPROCCOSINE ELSEIFN
    =6THENPROCSINE ELSEIFN=7THENPROCTANGENT ELSEIFN
    =8THENCLS:VDU23,1,1;0;0;0;:END
160GOTO140
170DEFPROCMENU
180CLS
190PROCBIGPRINT(13,2,CHR$141+CHR$136,"MENU")
200PRINTTAB(5,5)CHR$(133)"1. LOGARITHMS";TAB(5,7)
   CHR$(133)"2. ANTI-LOGARITHMS";TAB(5,9)CHR$(133)"
   3. SQUARE ROOTS";TAB(5,11)CHR$(133)"4. SQUARES"
210PRINTTAB(5,13)CHR$(133)"5. COSINES";TAB(5,15)CHR$
   (133)"6. SINES";TAB(5,17)CHR$(133)"7. TANGENTS";
   TAB(5,19)CHR$(133)"8. EXIT FROM PROGRAM";TAB(4,
   21);INPUT"CHOOSE YOUR OPTION ";N$=GET$:N=VAL(N$)
220ENDPROC
230DEFPROCBIGPRINT(X,Y,CONTROL$,MESSAGE$)
240PRINTTAB(X,Y);CONTROL$;MESSAGE$'TAB(X);CONTROL$;
   MESSAGE$
250ENDPROC
260DEFPROCLOGARITHM
270CLS
280PROCBIGPRINT(10,4,CHR$141+CHR$133,"LOGARITHMS")
290PRINTTAB(2,11)CHR$134;:INPUT Enter the number :
   "Y
300PRINTTAB(3,14)"The logarithm is : ";LOGY
310PRINTTAB(4,19);CHR$129;"Another logarithm (Y/N)?
   ";:A$=GET$
320ENDPROC
330DEFPROCANTILOGARITHM
340CLS
350PROCBIGPRINT(7,4,CHR$141+CHR$133,"ANTI-
   LOGARITHMS")
360PRINTTAB(2,11)CHR$134;:INPUT Enter the log : "Y
370PRINTTAB(3,13) The Antilogarithm is : ";10^Y
380PRINTTAB(4,19);CHR$129, Another antilogarithm
   (Y/N)?";:A$=GET$
390IF A$="Y" THEN 360
400ENDPROC
410DEFPROCSQUAREROOT
```

```
420CLS
430PROCBIGPRINT(10,4,CHR$141+CHR$133,"SQUARE ROOTS")
440PRINTTAB(2,11)CHR$134;:INPUT"Enter your number :
  "Y
450PRINTTAB(3,14)"The square root is : ";SQRY
460PRINTTAB(4,19);CHR$129;"Another square root
  (Y/N)?";:A$=GET$
470IF A$="Y" THEN 440
480ENDPROC
490DEFPROCSQUARE
500CLS
510PROCBIGPRINT(12,4,CHR$141+CHR$133,"SQUARES")
520PRINTTAB(2,11)CHR$134;:INPUT"Enter your number :
  "Y
530PRINTTAB(3,14)"The square is : ";Y^2
540PRINTTAB(4,19);CHR$129;"Another Square (Y/N)?";:
  A$=GET$
550IF A$="Y" THEN 520
560ENDPROC
570DEFPROCSINE
580CLS
590PROCBIGPRINT(15,4,CHR$141+CHR$133,"SINES")
600PRINTTAB(2,11)CHR$134;:INPUT"Enter your angle
  (degrees) : "Y
610X=RADY
620IF SINX<5E-5 THEN SINX=0
630PRINTTAB(3,14)"The sine is : ";SINX
640PRINTTAB(4,19);CHR$129;"Another Sine (Y/N)?";:
  A$=GET$
650IF A$="Y" THEN 600
660ENDPROC
670DEFPROCCOSINE
680CLS
690PROCBIGPRINT(13,4,CHR$141+CHR$133,"COSINES")
700PRINTTAB(2,11)CHR$134;:INPUT"Enter your angle
  (degrees) : "Y
710X=RADY
720IF COSX<5E-5 THEN COSX=0
730PRINTTAB(3,14)"The Cosine is : ";COSX
740PRINTTAB(4,19);CHR$129;"Another Cosine (Y/N)?";
  :A$=GET$
750IF A$="Y" THEN700
760ENDPROC
770DEFPROCTANGENT
780CLS
790PROCBIGPRINT(13,4,CHR$141+CHR$133,"TANGENTS")
800PRINTTAB(2,11)CHR$134;:INPUT"Enter the angle
  (degrees) : "Y
810X=RADY
820IF TANX<5E-5 THEN TANX=0
830PRINTTAB(3,14)"The tangent is : ";TANX
840IF Y<5E-5 THEN Y=0
850PRINTTAB(4,19);CHR$129;"Another Tangent (Y/N)?
  ";:A$=GET$
860IF A$="Y" THEN 800
870ENDPROC
880DEFPROCINSTRUCTIONS
890CLS
900PROCBIGPRINT(10,2,CHR$141+CHR$133,"INSTRUCTIONS")
910PRINTTAB(1,7)"This Program allows the user to
  calculate logarithms, sines, square    roots and
  other mathematical functions.
920PRINTTAB(1,12)"The escape key will return you to
  the   main menu at any time";PROCBIGPRINT(10,21,
  CHR$141+CHR$136,"PRESS ANY KEY"):A$=GET$
930ENDPROC
940 DEFPROCTITLES
950CLS
960PROCBIGPRINT(1,3,CHR$141+CHR$133,"MATHEMATICAL")
970PROCBIGPRINT(14,7,CHR$141+CHR$133,"TABLES")
980PROCBIGPRINT(16,11,CHR$141+CHR$130,"BY")
990PROCBIGPRINT(9,15,CHR$141+CHR$130,"STEPHEN
  LAVERTON")
000PROCBIGPRINT(10,21,CHR$141+CHR$136,"PRESS ANY
  KEY")
010A$=GET$
020ENDPROC
```

Mathematics
by Stephen Laverton

Curve

on Oric

This program written for the Oric is very simple but quite useful for the mathematician It is designed to draw a curve, either the sine or cosine curve depending on which one you input

The program is very straight forward, the only confusing lines are lines 80 and 110 These contain the values of X and Y which incidentally are the variables for the cursor position

When you have finished typing in the listing and have typed Run you are told to enter your required curve 'S stands for sine and 'C stands for cosine When the plotting has finished it returns to the beginning of the program and so you can try plotting a different curve

The axis range from 0 degrees to 360 degrees on the X axis and from −90 degrees to +90 degrees on the Y axis

```
10  PRINT CHR$(17) CHR$(6): PAPER0: INK2: HIRES
20  PRINT "Enter the required wave (S/C)"
30  GETW$
40  CLS
50  IF W$= "S" THEN PLAY1,0,1,500: GOTO 80
60  IF W$= "C" THEN PLAY1,0,1,500: GOTO 110
70  GOTO 20
80  HIRES: GOSUB 140: FOR X=0 TO 239. Y=99*SIN(*PI/120)
    +99: CURSET X,Y,1· NEXT X
90  PRINT. PRINT CHR$(140) CHR$(129)"THE SINE WAVE"
100 PLAY1,1,3,800: GOTO 20
110 HIRES: GOSUB 140: FOR X=0 TO 239: Y=99*COS(*PI/120)
    +99: CURSET X,Y,1· NEXT X
120 PRINT: PRINT CHR$(140) CHR$(129)"THE COSINE WAVE"
130 PLAY1,1,3,800· GOTO 20
140 CURSET 0,0,3: DRAW 0,199,1: CURSET 0,99,3: DRAW
    237,0,1: RETURN
```

Curve
by Stephen Chalmers

Stock Market

on Spectrum

This program tests your skill in making money on the Stock Market. You have three months to make your £800 into £100,000. Easy? It is until you start paying tax on your stocks which can be as much as 50 percent of your shares. To save the program type *GOTO* 9800

If you need to know how much memory you have left type *Print fn a$()*. If, however you have a 48K model then change the 9216 in line 9999 to 41984

```
  10 REM ****************************
  20 REM *      [illegible]         *
  30 REM *      [illegible]         *
  40 REM ****************************
  50 LET G=0: LET S=0: LET NI=0:
 LET L=0
  60 POKE 23658,8: GO SUB 6000:
GO SUB 5000
  70 LET MONEY=800: CLS
  80 REM ****************************
  90 REM *      MAIN PROGRAM        *
 100 REM ****************************
 110 FOR A=1 TO 12
 120 FOR M=1 TO 5: IF MONEY>=1E5
 THEN GO TO 8000
 130 LET D$=("Monday" AND M=1)+(
"Tuesday" AND M=2)+("Wednesday"
AND M=3)+("Thursday" AND M=4)+("
Friday" AND M=5)
 140 POKE 23692,255: IF RND>.61
THEN GO SUB 6500
 150 GO SUB 1000
 160 PRINT ''TAB 10,D$," Week ",
A
 170 PRINT ''TAB 12,"Prices ",TA
B 11,"Gold...£",P(1),TAB 11,"Si
lver..£",P(2),TAB 11,"Nickel..£
",P(3),TAB 11,"Lead...£",P(4)
 180 PRINT 'TAB 10,"You have £",
MONEY
 190 PRINT #0,"Option ?(A/B/C/D/
E/F)"
 200 LET A$=INKEY$: IF A$<"A" OR
A$>"F" THEN GO TO 200
 205 INPUT ""
 210 IF A$="A" THEN GO SUB 1500
 220 IF A$="B" THEN GO TO 170
 230 IF A$="C" THEN GO SUB 5000
 240 IF A$="D" THEN GO SUB 3000
 250 IF A$="E" THEN GO SUB 4000
 260 IF A$="F" THEN NEXT M: NEXT
A: GO TO 9500
 270 IF MONEY>=1E5 THEN GO TO 8E
3
 280 GO TO 190
1000 REM ****************************
1010 REM *      [illegible]         *
1020 REM ****************************
1030 DIM P(4)
1040 LET P(1)=(INT (RND*801))+20
0
1050 LET P(2)=(INT (RND*501))+15
0
1060 LET P(3)=(INT (RND*401))+10
0
1070 LET P(4)=(INT (RND*251))+50
1080 RETURN
1500 REM ****************************
1510 REM *      POSSESSIONS         *
1520 REM ****************************
1530 POKE 23692,255: PRINT '''TAB
 10,"Possessions",TAB 11,"Gold..
..",G,TAB 11,"Silver..",S,TAB 11
,"Nickel..",NI,TAB 11,"Lead....",
L'TAB 10,"Money..£",MONEY
1540 RETURN
3000 REM ****************************
3010 REM *      [illegible]         *
3020 REM ****************************
3030 PRINT : PRINT #0;AT 0,4;"Wh
at do you wish to buy ?",AT 1,13
;"(G/S/N/L)"
3040 LET B$=INKEY$
3050 IF B$="G" OR B$="S" OR B$="
N" OR B$="L" THEN GO TO 3060
3055 GO TO 3040
3060 IF B$="G" THEN LET AM=INT (
MONEY/P(1))
3070 IF B$="S" THEN LET AM=INT (
MONEY/P(2))
3080 IF B$="N" THEN LET AM=INT (
MONEY/P(3))
3090 IF B$="L" THEN LET AM=INT (
MONEY/P(4))
3095 POKE 23692,255
3100 INPUT ("You can afford ",AM
''"How many do you want ?")' LINE
 Z$
3105 IF Z$="" THEN GO TO 3100
3110 IF Z$(1)<"0" OR Z$(1)>"9" T
HEN GO TO 3100
3120 IF VAL Z$>AM THEN GO TO 310
0
3130 IF B$="G" THEN LET MONEY=MO
NEY-(P(1)*VAL Z$): LET G=G+VAL Z
$
3140 IF B$="S" THEN LET MONEY=MO
NEY-(P(2)*VAL Z$): LET S=S+VAL Z
$
3150 IF B$="N" THEN LET MONEY=MO
NEY-(P(3)*VAL Z$): LET NI=NI+VAL
 Z$
3160 IF B$="L" THEN LET MONEY=MO
NEY-(P(4)*VAL Z$): LET L=L+VAL Z
$
3170 INPUT "": RETURN
4000 REM ****************************
4010 REM *      SELL                *
4020 REM ****************************
4040 PRINT : PRINT #0;AT 0,3;"Wh
at do you want to sell?";AT 1,10
;"(G/S/N/L)"
4050 LET B$=INKEY$
4060 IF B$="G" OR B$="S" OR B$="
N" OR B$="L" THEN INPUT "": GO T
O 4070
4065 GO TO 4050
4070 PRINT : PRINT AT 21,0;"You
have ";
4080 PRINT (G AND B$="G")+(S AND
 B$="S")+(NI AND B$="N")+(L AND
B$="L")
4090 INPUT "How many do you wish
 to sell ?"; LINE Z$
4095 IF Z$="" THEN GO TO 4090
4100 IF Z$(1)<"0" OR Z$(1)>"9" T
HEN GO TO 4090
4110 IF B$="G" AND VAL Z$>G THEN
 GO TO 4090
4120 IF B$="S" AND VAL Z$>S THEN
 GO TO 4090
4130 IF B$="N" AND VAL Z$>NI THE
N GO TO 4090
4140 IF B$="L" AND VAL Z$>L THEN
 GO TO 4090
4150 IF B$="G" THEN LET MONEY=MO
NEY+(P(1)*VAL Z$): LET G=G-VAL Z
$
4160 IF B$="S" THEN LET MONEY=MO
NEY+(P(2)*VAL Z$): LET S=S-VAL Z
$
4170 IF B$="N" THEN LET MONEY=MO
NEY+(P(3)*VAL Z$): LET NI=NI-VAL
 Z$
4180 IF B$="L" THEN LET MONEY=MO
NEY+(P(4)*VAL Z$): LET L=L-VAL Z
$
4190 PRINT AT 20,0,"

4200 RETURN
5000 REM ****************************
5010 REM *      INSTRUCTIONS        *
5020 REM ****************************
5030 CLS : LET M$="INSTUCTIONS**
*********************"
5040 FOR N=1 TO 11
5050 PRINT AT 0,0;M$
5060 LET M$=M$(32)+M$
5070 LET M$=M$( TO 32)
5080 PAUSE 5
5090 NEXT N
5100 PRINT AT 3,1;"The idea of t
his program is to accumulate £10
0,000 during threemonths on the
Stock Exchange."
5110 PRINT AT 7,1;"You achieve t
his by dealing in Gold,Silver,Ni
ckel and Lead. Theprice of these
 comodities variesas shown below
."
5120 PRINT AT 12,3;"Commodity
  £      - £"
5130 PRINT AT 14,4;"Gold
  200       1000",TAB 4,"Silver
      150       750",TAB 4,"Nickel
        100       500",TAB 4,"Lead
            50       300"
5140 GO SUB 9000
5150 PRINT AT 1,1;"At the start
you are given £800and a display
of the market      prices is show
n. Also there are six options wh
ich mean "
5160 PRINT AT 7,2;"(A)..Print up
 your possessions",TAB 2,"(B)..P
rint the market prices",TAB 2,"(
C)..Print these instructions",TA
B 2,"(D)..Buy comodities",TAB 2,
"(E)..Sell comodities",TAB 2,"(F
)..Quit"
5170 PRINT AT 19,11;"Good Luck"
5180 GO SUB 9000
```

```
5190 RETURN
6000 REM ************************
6010 REM * YOU HAVE SUCCEEDED   *
6020 REM ************************
6030 CLS : PRINT AT 6,13;"WELL D
ONE"
6040 PRINT AT 10,4;"YOU HAVE MAN
AGED TO MAKE"
6050 PRINT AT 12,4;"THE REQUIRED
 £100,000"
6060 PRINT AT 14,6;"YOU FINISHED
 ON ";D$;" WEEK ";A
6070 PRINT AT 16,2;"YOUR AVERAGE
 EARNINGS WERE",AT 17,9;"£";INT
 (MONEY/((A*5)+M));" A DAY"
6080 GO TO 9560
6500 REM ************************
6510 REM *     TAX DEMANDS      *
6520 REM ************************
6530 POKE 23692,255: PRINT ' TAB
 1;"You have to pay some tax"
6540 IF RND>.5 THEN GO TO 6700
6550 PRINT '"The rate is 1/4 of
 your shares"
6560 LET G=G-(INT (G/4)): LET S=
S-(INT (S/4)): LET NI=NI-(INT (N
I/4)): LET L=L-(INT (L/4))
6570 RETURN
6700 PRINT '"The rate is 1/2 yo
ur shares"
6710 LET G=G-(INT (G/2)): LET S=
S-(INT (S/2)): LET NI=NI-(INT (N
I/2)): LET L=L-(INT (L/2))
6720 RETURN
8000 REM ************************
8010 REM *      FRONT PAGE      *
8020 REM ************************
8030 BORDER 1: INK 7: PAPER 1: C
LS
8040 DIM N$(2,32)
8050 LET N$(1)="  SPEC **********
****************"
8060 LET N$(2)="  SOFT **********
****************"
8070 FOR N=0 TO 4 STEP 2
8080 PRINT AT N,0;"**************
******************"
8090 NEXT N
8100 FOR N=1 TO 14
8110 PRINT AT 1,0;N$(1),AT 3,0;N
$(2)
8120 LET N$(1)=N$(1,32)+N$(1)
8130 LET N$(2)=N$(2,32)+N$(2)
8140 LET N$(1)=N$(1, TO 32)
8150 LET N$(2)=N$(2, TO 32)
8160 NEXT N
8170 PRINT AT 8,12;"PRESENTS
                 ========"
8180 PRINT AT 10,6;"* STOCK MARK
ET *"
8190 PRINT AT 15,6;"© GUY FULLHL
OVE 1983"
8200 PLOT 0,0: FOR N=1 TO 3
8210 DRAW 32,32: DRAW 32,-32
8220 NEXT N: DRAW 32,32: DRAW 30
,-32
8230 PLOT 0,32: FOR N=1 TO 3
8240 DRAW 32,-32: DRAW 32,32
8250 NEXT N: DRAW 32,-32: DRAW 3
0,32
9000 REM ************************
9010 REM *    PRESS ANY KEY     *
9020 REM ************************
9030 PRINT #0; TAB 4; FLASH 1;"Pr
ess any key to continue"
9040 PAUSE 0
9050 INPUT ""
9060 CLS : RETURN
9500 REM ************************
9510 REM *      YOU LOST        *
9520 REM ************************
9530 CLS : PRINT AT 5,7;"YOU HAV
E FAILED TO"
9540 PRINT AT 9,8;"REACH YOUR TA
RGET"
9550 PRINT AT 12,0;"KEEP AWAY FR
OM THE STOCK MARKET",AT 14,9;"IN
 THE FUTURE"
9560 PRINT AT 19,7;"ANOTHER GO (
Y/N) ?"
9570 FOR N=-10 TO 20
9580 LET B$=INKEY$
9590 IF B$="Y" THEN RUN
9600 IF B$="N" THEN STOP
9610 BEEP .01,N
9620 NEXT N
9630 GO TO 9570
9800 REM ************************
9810 REM *    AUTO RUN SAVE     *
9820 REM ************************
9833 SAVE "Stock Mar" LINE 50
9840 VERIFY "Stock Mar"
9850 STOP
9995 REM ************************
9996 REM *HOW MUCH MEMORY LEFT? *
9997 REM *    PRINT FN A$()     *
9998 REM ************************
9999 DEF FN A$()=STR$ (9216-((PE
EK 23641+256*PEEK 23642)-(PEEK 2
3635+256*PEEK 23636)))+" Bytes"
```

Stockmarket
by Guy Fullalove

Weird Waves

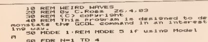
on BBC

This program is designed to demonstrate the colour capabilities of the BBC Model B computer. The program operates in mode 1 and produces four waves in a random colour using the first digit in the *Gcol* command.

The waves are produced using two sine waves, to which the computer moves to the relative point and then draws to the point on the second sine wave producing a solid wave of colour.

Because the colours are random it will use different colours each time it is run but the waves remain the same because they are stored in a *Data* statement.

The program will run on a Model A in mode 5 by changing the mode statement in at line 50. Z and Z1 are the numbers which the waves are based on.



```
   10 REM WEIRD WAVES
   20 REM by C.Ross  26,4,83
   30 REM (C) copyright
   40 REM This program is designed to de
monstate the GCOL command in an interest
ing way.
   50 MODE 1:REM MODE 5 if using Model
A
   60 FOR N=1 TO 4
   70 CLS
   80 READ Z,Z1
   90 C=RND(1000)
  100 GCOL C,4:PRINT "GCOL ";C;",1",:PRI
NT "Z=";Z;"  Z1=";Z1
  110 FOR X%=1 TO 1200 STEP 5
  120 Y%=500-Z+500-Z*SIN((X%/Z*2)*PI)
  130 MOVE X%,Y%
  140 Y%=500-Z1+500-Z1*SIN((X%/Z1*2)*PI)

  150 DRAW X%,Y%
  160 NEXT X%
  170 NEXT N
  180 END
  190 DATA 200,300,100,300,150,270,
      300,476
```

Weird Waves
by Christopher Ross

Solids

on ZX81

This program is for any ZX81 either expanded or unexpanded. It will find the volumes of the five main objects one considers for O-level maths, ie, the cube, the cylinder, the cone, the sphere and the square-based pyramid. The program is an example of memory economy using codes of characters and the calling of the same routines by different parts of the program.

The line numbers of these routines are stored as variables at the beginning of the program, thus one can save memory by calling the variable. Instead of, for example, *26 Goto Code "6"*, we get the line *26 Goto E*, thus saving three bytes.

The graphics characters used in the program are as follows: character 7, *Lines 8* and *10*; character 1 and character 5, *Line 12*; character 3, *Lines* 25 and 35; character 4 and character 3, *Line 29*.

I hope other users, especially maths candidates, find the program useful.

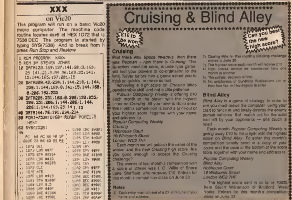
Program notes

- 1-4 Line numbers of important routines
- 5-12 Choose which volume you require
- 13-15 Volume of cube
- 18-21 Volume of cylinder
- 23-26 Volume of cone
- 28-30 Volume of sphere
- 33-35 Volume of pyramid
- 36-38 Print volume of object and stop
- 39-47 Main routines to input certain measurements

The user should be careful to input all measurements in the same scale, eg mm, cm, etc, or he/she will get some very funny results.

```
   1 LET E=CODE "8"
   2 LET S=CODE "B"
   3 LET D=CODE "2"
   4 LET I=CODE "H"
   5 PRINT "1..CUBE","2..CYLINDE
R","3..CONE","4..SPHERE","5..PYR
AMID (SQUARE BASE)"
   6 PRINT "PRESS NO."
   7 LET A$=INKEY$
   8 IF A$="" THEN GOTO CODE "■"
   9 IF CODE A$>CODE "0" AND COD
E A$<CODE "5" THEN GOTO VAL "11"
  10 GOTO CODE "■"
  11 CLS
  12 GOTO CODE "$"+(VAL A$-CODE
"■")*CODE "■"
  13 GOSUB S
  14 LET V=B*B*B
  15 GOTO E
  18 GOSUB O
  19 GOSUB I
  20 LET V=A*A*PI*H
  21 GOTO E
  23 GOSUB O
  24 GOSUB I
  25 LET V=PI*A*A*H/CODE "■"
  26 GOTO E
  28 GOSUB O
  29 LET V=CODE "■"*A*A*A*PI/COD
E "■"
  30 GOTO E
  33 GOSUB S
  34 GOSUB I
  35 LET V=B*B*H/CODE "■"
  36 CLS
  37 PRINT "VOL OF OBJECT=";V
  38 STOP
  39 PRINT "BASE SIDE?"
  40 INPUT B
  41 RETURN
  42 PRINT "RADIUS?"
  43 INPUT A
  44 RETURN
  45 PRINT "VERTICAL HEIGHT?"
  46 INPUT H
  47 RETURN
```

Solids
by Mike Davies



XXX

on Vic20

This program will run on a basic Vic20 micro computer. The machine code routine locates itself at HEX 1D72 that is 7538 DEC. The program is started by typing SYS(7538). And to break from it press *Run Stop* and *Restore*.

```
1 REM PROGRAM  XXX
5 REM BY STEVEN JONAS
10 DATA120,169,127,141,20,3,169,
   29,141,21,3,88,36,169,25,141,
   15,144,165,197,201,15
20 DATA208,42,238,1,144,238,1,144,
   238,1,144,169,8,141,15,144,160,
   0,206,192,255
30 DATA208,251,160,0,200,192,255,
   208,251,206,1,144,206,1,144,
   206,1,144,169,25,141,15
40 DATA144,76,191,234,234
50 FORI=7538TO7607:READA:POKEI,A
   :NEXT
60 SYS(7538)

   PC  SR AC XR YR SP
.;6B2E 33 00 63 00 F6
.,1D72 SEI
.,1D73 LDA #$7F
.,1D75 STA $0314
.,1D78 LDA #$1D
.,1D7A STA $0315
.,1D7D CLI
.,1D7E RTS
.,1D7F LDA #$19
.,1D81 STA $900F
.,1D84 LDA $C5
.,1D86 CMP #$0F
.,1D88 BNE $1DB4
.,1D8A INC $9001
.,1D8D INC $9001
.,1D90 INC $9001
.,1D93 LDA #$08
.,1D95 STA $900F
.,1D98 LDY #$00
.,1D9A INY
.,1D9B CPY #$FF
.,1D9D BNE $1D9A
.,1D9F LDY #$00
.,1DA1 INY
.,1DA2 CPY #$FF
.,1DA4 BNE $1DA1
.,1DA6 DEC $9001
.,1DA9 DEC $9001
.,1DAC DEC $9001
.,1DAF LDA #$19
.,1DB1 STA $900F
.,1DB4 JMP $EABF
.,1DB7 NOP
```

Cruising & Blind Alley

£10 to be won

Can you beat the new high score?

Cruising

First there was *Space Invaders*, then there was *Pacman* – now there is *Cruising*. This all-action machine code, arcade type game will test your powers of co-ordination to the limit. Never before has a game asked you to think so quickly or move so fast.

Achieving a high score on *Cruising* takes considerable skill and not a little patience.

Popular Computing Weekly is offering £10 each month to the player with the highest score on *Cruising*. All you have to do to enter this month's competition is send a print-out of your highest score together with your name and address to:

Popular Computing Weekly
Cruising
Hobhouse Court
19 Whitcomb Street
London WC2 7HF

Each month we will publish the name of the winner and the new *Cruising* high score. Are you good enough to accept the *Cruising* challenge?

The winner of last month's competition with a score of 22664 was I C Willis of Shore Lane, Sheffield, who receives £10. Entries for this month's competition close on June 30.

Notes

1) Each entry must consist of a ZX printout and your name and address.
2) Closing date for this month's *Cruising* challenge entries is June 30.
3) The highest score each month will receive £10.
4) High scores cannot be transferred from one month to another.
5) The judges' decision is final.
6) No employees of Sunshine Publications Ltd or their families will be eligible to enter.

Blind Alley

Blind Alley is a game of strategy. In order to win you must outwit the computer, using your craft to fence in and finally destroy the enemy pursuit vehicles. But watch out for the solid trail left by your opponents — one touch is fatal!

Each month *Popular Computing Weekly* is giving away £10 to the player with the highest score on *Blind Alley*. To enter this month's competition simply send in a copy of your score and the code at the bottom of the score table, together with your name and address to:

Popular Computing Weekly
Blind Alley
Hobhouse Court
19 Whitcomb Street
London WC2 7HF

The highest score sent in so far is 70625, from Stuart Williamson of Bradford, West Yorks. Entries for this month's competition close on June 30.

Volcanic catacombs

Camel Software of Slough has had considerable and well-earned success with its *Volcanic Dungeon* program for the ZX81 The company has recently released versions for the 48K Spectrum and the Dragon

For those of you who have not seen *Volcanic Dungeon*, it follows the same company's *Black Crystal* in being very well-packaged in a large box, complete with booklet The first two pages contain the now obligatory bit of fantastic scene-setting which everyone must now include with their cassettes — a story about Methzar goddess of evil, who captures the elfin princess Edora and, with the help of the witch Magra imprisons her in a crystal coffin somewhere within the catacombs of the *Volcanic Dungeon*

The Princess knows the secret of the whereabouts of the seeds of life You are charged by her father now near to death, with rescuing the princess and thus lifting the blight that has settled on the land

At the start of the game, you are at the entrance to the *Volcanic Dungeon* excavated by dwarfs — you have with you a sword, and a magic ring which will change shape according to the current strength of the witch Magra She is loose somewhere within the cave complex and you will have to do battle with her eventually As you move through the caves, you have the aid of a map given to you by the dwarfish builders of the dungeon

This is a text adventure, although unusually, the text is white on black The display includes the magic ring at the top of the screen with its changing shades, and a graphic representation of your current weapons and armour

You are allowed to carry 10 weapons, including the original sword These weapons are scattered at random throughout the complex and assuming that no monster is guarding them may be picked up or discarded at will

The game is beautifully balanced Each weapon has its own attack and defence capabilities — your knowledge of mythology will be put to the test when selecting a weapon for battle with particular monsters Thus the stake is obviously a good weapon when fighting the vampire, and the dragon s tear is the defence against a cyclops How though, do you kill the dragon to get its tear, and what weapon will you use to fight the witch?

Not only has the weapons system been well thought out so has the movement system Each of your moves, or attack/defend commands uses up one of your strength units and one of your water units, both originally set at 100 Each monster you kill will bump up your strength rating (so you can t keep avoiding battle) but your water can only be replenished by finding one of the four wells

On rescuing the princess (he says it so glibly!) your strength rating falls dramatically and you will use up your water at twice the initial rate in getting the princess out — and the monsters are still about!

The whole game mechanism makes for a very addictive program and one that remains a firm favourite with many adventurers Apparently there is some competition among many of the fans of *Volcanic Dungeon* to see who can complete the adventure in the quickest time Well now there is an official competition run by Camel, details of which are printed in the booklet Two weeks in Florida including visits to the Epcot Center — how about that for first prize? The final will be held at the Earl's Court Computer Fair in June

Now a plea for help! Since I first asked you to send in your requests for tips to get you through sticky situations, I've been inundated with letters What I need now are more tips and hints from you the readers I have a lot of questions about Vic20 adventures as well as Dragons and Ataris If you have a few spare minutes between adventures just jot down a few thoughts you ve had whilst playing particular adventures, and the strategy you ve used to complete them I hope then Id match these up with the *Help* letters With advice from the manufacturers we should be able to build up a good library of tips

One or two of you have taken me to task for not replying personally to your letters I apologise but there are so many letters that I can only reply to them through this column

Talking of readers letters and manufacturers, I'm reminded of a point raised by John Shiell, whose letter I mentioned a couple of weeks ago He wonders if, with the advent (no pun intended!) of the Timex 2000 (Spectrum to us) we might eventually see some Scott Adams adventures currently enjoyed by those lucky Vicers By all accounts they are archetypal difficult games — maybe we should get up a petition to get these adventures converted to other micros

J Eldridge is stuck at the forcefield on Artic s *Planet of Death* Run our decoding program, and then type in

feerh • nl • e • edcrletnae

and

speisehrgeyours • del • rnt •• r • mer

Mr Eldridge has a tip for anyone just beginning *Planet of Death*, and who might be having trouble in the laser shed. Make sure you have the board, and then

u • a •• e • wdrabrtbednoedorko • o"

John, from Crescent Road in Dagenham is trying to get at the *Inca Treasure* (oh all right Artic's *Adventure B*) with his Spectrum You re nearly there, John, but try typing this

rvectisheea/ • com • vgekvoleet/l"

then

'b • h • kmeac • uorls/bpekigneauic • e • hhratslls/gr • koeckuooed"

That ll get you into the temple, there's still a lot to do — good luck!

Incidentally, some of you have followed my advice and sent Artic your SAE s requesting *Help* sheets After several weeks — no reply I agree that this is not good public relations but let s give them the benefit of the doubt and assume that they re working on *Adventure E* for us even now

In the meantime *keep your eye* on the *Cyclops!* ■

● *Inventory* this is another of those words which are often left undocumented in an adventure program It s a way to look at what you re carrying — you wouldn t want to attack an Orc when all you re carrying is an empty bottle would you? (Oh, I don t know, though, it might be made of glass and that might have some effect but then bottles in most adventures are, perversely mostly of leather!) Often abbreviated to *Invent*, though not *In*, you might end up somewhere you don't want to explore just yet! You might also want to try *List*

This series of articles is designed for novice and experienced Adventurers alike Each week Tony Bridge will be looking at different Adventures and advising you on some of the problems and pitfalls you can expect to encounter So if you have an Adventure you want reviewed or if you are stuck in an Adventure and cannot progress any further write to Tony Bridge Adventure Corner *Popular Computing Weekly* Hobhouse Court, 19 Whitcomb Street, London WC2 7HF



A CERTAIN TOUCH

F Hill of Horridge Farm, Ashford, near Banstable, Devon writes

Q How do you incorporate data statements in a Spectrum? Also, could you please stop putting Spectrum programs under ZX81 programs

PS. The magazine lost a certain touch when it lost Citizen Pain

A Data statements must be used along with *Read* commands — one without the other will produce an error code. The other associated command is *Restore* though this is not always necessary

Individual pieces of data must be separated by a comma, and *Data* statements used to assign values to a string must always be in inverted commas

The *Read* statement must be used to read each item of Data from the *Data* statement That is why the *Data* statement must always be arranged *after* the Read command in the program Until you get used to using them you might find it best to follow the *Read* statement with its *Data* statement immediately, it certainly makes for easier editing However, it is generally considered better to keep all the *Data* statements together at the end of a program *Read/Data* lines can be very fickle A *Read* statement is always followed by a variable, to which the value of the data will be assigned If you put the wrong type of variable into the *Data* statement the computer will not ignore it and carry on until it finds the first appropriate *Data* statement — it will give an error message Try running this

```
10 READ A
20 DATA Ian is 300
30 PRINT A
```

Now try changing Line 20 to

```
20 DATA 100, 200, 300
```

and add

```
40 GOTO 10
```

To see how a string works *Enter* the following

```
20 READ a$
30 DATA "Ian", "is", "100"
40 PRINT a$
50 GOTO 20
```

You refrain from telling us what sort of 'touch' we lost with the demise of Citizen Pain Could you mean the touch of gold, the touch of death or what ?

HOW MANY BYTES . . .

John Baseford of Compass Crescent, Old Whittington, Chesterfield, writes

Q If the Vic20 in its unexpanded form has 5K of memory, how come that when I switch it on it says 3583 bytes free? This to my reckoning is one byte less than 3½K. Is this one byte taken up with the flashing cursor?

A The reason that the Vic only has 3.5K of user available RAM on the unexpanded machine, is because 1K is taken up by the systems variables at the bottom of the memory, and 0.5K is used for the screen All computers need to have some space in the RAM reserved for use by the ROM

As for the odd 1 byte missing, in fact this is the same situation that I have explained before, namely the first address used by a computer is 0 which makes the second address 1 and so on

ATARI MAGAZINES

Julian Bently of The Lea, Trentham Stoke on-Trent, writes

Q I am 12 years old, and am thinking of buying an Atari 400. I would like to know if an Atari 400 (16K) is expandable to 32K If there is an expansion available I would like to know how much it costs, and who I can get it from I would also like to know if there is a magazine for the Atari, and if a cassette is necessary for most programs on the Atari.

A A 32K RAM board for the Atari 400/800 is available from the Spectrum group of shops for £75 Your nearest Spectrum shop is probably Computerama, 11 Market Squure, Stoke-on-Trent

At least two shops run clubs for Atari owners, one is run from the Silica shop at 1-4 The Mews, Hatherley Road, Sidcup, Kent Another can be contacted through Maplin at PO Box 3 Rayleigh, Essex

The cassette player is not absolutely necessary for the Atari, because of the number of modules that are available However, if you have no way of storing your own programs, you are likely to find it difficult to develop your own programming skills You will also find that you will be cut off from a great many other programs that are available on cassette

DELAYED COUPLER

N G Macmillan of Lochgreen Avenue, Brassie, Troon Ayrshire writes

Q Could you please tell me which of the two micros, the BBC B and the Spectrum, would download programs from the Micronet database (via a telephone) faster? Would the data or programs be fed into the RS432 socket, or the tape socket on the BBC machine?

A At the moment the Spectrum is still not on line with the Micronet 800 network, though this should change quite soon The transmission rate from the database to you is governed by British Telecom and is at a standard 1200 Baud The transmission from you to the database is at 75 Baud I presume that the delay with the Spectrum coupler is because of the necessary software that will enable the Spectrum to interpret 1200 Baud, instead of its normal 1500 Baud

The Acoustic coupler is a separate unit that uses an RS232 interface, so at the moment it is only available on the BBC B

AT THE RACES!

Mr P B Pardon of Bristol Road, Birmingham, writes

Q I wish to place details from various race meetings into a computer in such a way that I can juggle any part that is necessary. I also want to be able to extract performance details for types of race, distance, and numbers of runners Would this be possible on a ZX81 with the proposed new microdrive? If not, have you any ideas which home micro would be useful for handling this type of material As I do not know anything about computers I would be grateful if you could give me some advice.

A What you are after is a 'calc' program, some were reviewed by Tony Bridge in *Popular Computing Weekly* Issue 15, including *Vu Calc, Mutacalc Omnicalc* and *Flexicalc* All these are aimed at the Spectrum, but there are several 'calc' type programs available for the ZX81 as well

A lot will depend on what else you want to do with your computer If you don t want to spend a lot of money and want to use it for games as well, then a 48K Spectrum would be as good a buy as any, and probably better if you are already used to Sinclair BASIC

As for the Microdrives, I do not expect them to be avail able for some months yet though they should be useable on a ZX81 soon after being released The problem with a ZX81 and the amount of information that you want to use, is the *Loading* time of any program or data stored on cassette tape

I do not usually recommend a specific machine because it depends on how much money you want to spend However, I would suggest that you look at issue 15 and if this is the sort of program you are after, then a Spectrum would probably be your best choice

Is there anything about your computer you don't understand, and which everyone else seems to take for granted? Whatever your problem *Peek* it to Ian Beardsmore and every week he will *Poke* back as many answers as he can. The address is *Peek & Poke, PCW*, Hobhouse Court, 19 Whitcomb Street, London WC2 7HF.

CLASSIFIED

Semi-display — £5 per single cc
Trade lineage — 20p per word
Private lineage — 10p per word

CALL *DIANE DAVIS* ON *01-839 2476* FOR SEMI-DISPLAY ADVERTISING

GAMES SOFTWARE

LET YOUR DRAGON 32 MEET THE REAL WORLD
Eight-bit A D converter board Features Fast conversion (18/36 s) Plugs into cartridge socket 0-5v or 0-10v input range Address selectable on PORT2
ONLY £29 50 + 50p p&p (UK)
including some suggested applications.
Order only from
PNP Communications
52 Lewes Avenue Newhaven E Sussex
(Prop P R Simmons)

MISSILE defend your cities from evil deadly onslaught. Graphics game for the BBC microcomputer (32K) only £5 inclusive to Paul Stevens 11 Woodhurst Close, Cuxton Rochester Kent ME2 1LU

48K SPECTRUM DARTS Five different games on board scoring with options Play computer or opponent(s) R. Kear 53 Kevockvale Park, Lasswade Midlothian Scotland

CHRISTINE COMPUTING
TI99 4A SOFTWARE
NORTH SEA, CODE BREAK ASTRO-FIGHTER
£3.00 each £8.00 for five £8 for all each
SAE for Hardware/Software Catalogue to
Dept PCWK, 6 Florence Close Watford, Herts.

SATURN SOFTWARE FOR TI99ers presents Leapfrog (based on the arcade game Frogger) in extended Basic joysticks optional £3 99 Also Ski-ing £2 99 in TI Basic 39 River Park Marlborough Wiltshire SN8 1NH

BBC 32K GAMESTAPE six programs including Pontoon Poker Bridge Hangman, £4 K. Banga 48 Derby Lane Derby

VIC20 SOFTWARE. Mission Impossible £17 Mynad Night Crawler Wacky Walters, Cosmiads Skramble £4 each Tel 051-424 1325

SPECTRUM 16/48K FA Cup and Division 1 simulations Caters for all rounds and replays League programme covers every match displaying full table after every set of results with relative positions and records Send cheque/PO for £6 including p&p to R Window 18 Easthorne Road Crewkerne Somerset.

BBC MODEL B — POKER £3 Bluff and gamble with three computerised card sharps at saloon style seven-card stud poker Full instructions and house rules included Cheques to C J Matthews, 20 Exton Road Sherwood Nottingham

ZX SOFTWARE FOR SPECTRUM 16/48K
Personal Reminder program — an excellent system for keeping track of birthdays appointments etc. Also Tel/Address program — stores 40/100 records on 16/48K. Full user Address include special search routine Only £3 95 each or two for £6 95 including p&p computer cassette and instructions Send cheque/PO (stating computer type) to 64 Micro-Systems PO Box 24 [illegible] [illegible]

FUN TIMES GAMES
BARGAIN
4 GAMES ONLY £4.50
Inc. VAT and P&P
SPECTRUM 16/48K
MUNCH CHOPS
SUPER LANDER
STAR RIDER
HOUSE OF FEAR
FUN TIME GAMES
EASTLANDS, JUBILEE LANE
LANGFORD, AVON BS18 7EJ
Tel 0934 862576

ASSASSIN SOFTWARE
48K Spectrum Toads Travels Four Lanes of Traffic Children's Playground, Hungry Crocodiles Floating Logs.
£4.95 to
18 ASH ROAD LEEDS LS6 3JF
Cheques/POs payable to Tom Austed

VIC BINGO MASTER automatic calling system simple to use/operate super graphics basic + machine code £3 50 A. F Hinxman 11 Sherwood Close, Christchurch Dorset.

SPECTRUM PROGRAMS
SPECTRUM GOLF BY R+R
16K — £3 75 INC
One or two players 9-hole or 18-hole course fairway rough green bunkers trees and water hazards Each course different
SPECTRUM MICRO CHESS BY ARTIC
16K — £9 95 INC
Accepts all legal moves en passant castling and promotes a pawn to queen
MURDER ON SPEC BY MICROACE
16K — £8 [illegible]
Ingenious murder game in which you are the investigator
Mail order only [illegible] cheques/POs to
[illegible] 11 Margaret [illegible]
St Austell Cornwall
(or [illegible] for list)
Tel St Austell 61781

TI-99/4A AND SPECTRUM software For full list send SAE to 10 Potterill Lane Sutton Hull HU7 4TF

SPECTRUM (16/48K) and ZX81 (16K) Crazy Adventure 1 at a crazy price £2.75 (inc P&P) Four superb card games £3.25 (inc P&P) Andrew Storey 192 Orton Road, Carlisle Cumbria CA2 7HD

93 BBC MICRO PROGRAMS, Model A/B Include Connect 4 Othello Mutant Sid and many others Machine code and Basic programs Send £6 payable to B Pithers Great Coleman London Road Ongar Essex

DRAGON 32
ACE HIGH
One Spitfire a Battle of Britain Destroy the enemy planes and earn your Wings 25 will tell you are the One Up to two minutes violent action
High res graphics cockpit view rear mirror [illegible] realistic sounds reward system and detailed scorecard A quality 32K game Not available in or to libraries or club systems
Fast service £7 95 includes p&p
TUDOR WILLIAMS
18 SUMMERHILL ROAD
BILSTON WV14 8RD

C F DATA SYSTEMS
DRAGON 32
Enchanted Garden
(padded cell extra) £4 95
Alien Attack £2 95
Both games post FREE from
4 MARSTON ROAD THAME OXON

LYNX 48K SOFTWARE
Labyrinth — 3D Maze Game
Othello — our version of popular board game in cell machine code
Chancellor — run the UK economy for 10 years
£4.75 each inc. p&p. Cheques/P.O. to
QUAZAR COMPUTING DEPT PCW
17 TEC CLOSE PORTSLADE SUSSEX.

ARCADE TYPE GAMES for the Dragon, using full colour high-resolution graphics and excellent sound routines Three exciting games on one cassette written in Basic and Machine code including Baseestar Boxer Deathfight No joysticks needed Send £3 50 to J Foley 8 Belle Vue Gardens Consett Co Durham DH8 6LR

★ LYNX MUSIC MASTER ★
New LYNX music is easy! Full two-octave stave on screen compose copy replay change on/po etc Cassette and full instructions £4 95.
ALBASOFT, 186 Terregles Avenue Glasgow G41 4RR

DISCOUNT COMPUTERS for business education and leisure eg Commodore 64 £309 95 incl VAT p&p 5M Software Freepost, Rotherham S66 0BR Tel (0709) 530540 for catalogue

VIC20 C2N, super expander Basic PTS1x2 16K Ram various games programme reference guest All at fair prices. Ring Chelmsford 61578 (evenings)

ACE SOFTWARE. Seven games for the unexpanded Jupiter Ace only £4 Federation Software 56 Rawley Crescent New Duston Northampton

EARN MONEY

EARN MONEY SELLING SPECTRUM SOFTWARE. SAE to TJO Norlington Lewes Road East Grinstead

CLASSIFIED ADVERTISING RATES:

Line by line. For private individuals 10p per word minimum 10 words
For companies traders and all commercial bodies 20p per word, minimum 20 words

Semi-display £5 per single column centimetre minimum length 2 cm (Please supply A/W as PMT Or supply rough setting instructions)

Conditions All copy for Classified section must be pre-paid Cheques and postal orders should arrive at least two weeks before the publication date.

If you wish to discuss your ad, please ring Diane Davis 01 839 2476

Here's my classified ad.

(Please write your copy in capital letters on the lines below.)

		Please continue on a separate sheet of paper	

I make this ______ words, at ______ per word so I owe you £ ______

Name ______

Address ______

______

______

Telephone ______

Please cut out and send this form to Classified Department, *Popular Computing Weekly*, Hobhouse Court 19 Whitcomb Street London WC2



EDUCATIONAL SOFTWARE

VIC20 UNEXPANDED Help with spelling program plus Frog game (age grouped 4-12) both colour and sound just £2 all plus 35p p&p. Buy before June 30 and receive additional game free. Send remittance and age to JP Software 86 Alderson Road, Great Yarmouth, Norfolk

EDUCATIONAL DRAGON SOFTWARE. Tell the time uses Hi-res and sound in the limits, English and German versions available only £4.99 each. Please state which you require. Cheques to Philip Kirlan 202 Skipton Road Harrogate North Yorkshire, England

CAN YOU WRITE EDUCATIONAL programs for use by teachers on the BBC model B? If you think your standard is high enough and want to know more about our royalties send example program on cassette to Micro Concept 22 Aventry Avenue Grimsby Humberside

SPECTRUM PRIMARY SCHOOL Arithmetic has functions, six levels, graphics and sound £3.99 G W Smith 84 Happur Crescent, Alsager Stoke-on-Trent ST7 2SY

BBC DISC PROGRAMS
First Maths Ten
Ten primary maths programs All on one disc
★ Algebra ★ Pound ★ Sorted ★ Rand ★ Pounds ★ Liquids ★ Shapes ★ Clocks ★ Sub ★ Triangles ★
All Menu driven Tried and tested Ready for quick despatch £10 inc p & p No VAT
Phil Bosotti Larlat Rue Sauvage
St. Sampsons Guernsey C I

FOR SCHOOLS Scrambler a program to help teach spelling in the classroom situation Any BBC or Spectrum Over 100 examples and your own includes manual For details send address of school to Mentor Software Freepost, Sheffield S6 2NT

FOR SCHOOLS Scrambler a program to help teach spelling in the classroom situation Any BBC or Spectrum. Over 100 examples and your own included manual For details send address of school to Mentor Software Freepost Sheffield S6 2NT

SPECTRUM TURTLE GRAPHICS Full feature 48K version 16K version plus two 16K Turtle games Tested in school Cassette with instructions £4 From Colin Hicks 41 Teddington Park, Teddington Middx

UTILITIES

ORIC-1
CREATE HIGH SPEED PROGRAMS WITH EDITOR ASSEMBLER DISASSEMBLER
Instant benefit powerful machine code is available at your fingertips with this complete program. Auto address and disassembly of code with control key and line forth scrolling for input and editing. Band assembly and error message support ANSI to programming in Basic
Cursor controlled Editor and direct change insert and delete with automatic expansion and or closure of text. Decimal or hex input of numbers with toggle dec/hex display of address and operands. Mixed code with tape inputs up to 256 characters Relocate load function
Full 6502 code plus Labels with and branch calculation Pseudo ops ORG START END DEL EQU DEFB DEFW DEFS DEFS
Optional tape speed HEX display as per a Basic or list Disassembly with address Hex code label Mnemonic Operand and symbols label output to screen or printer
Complete with instruction manual £15
MICROPLOT
18 The Birch Road Cheylesmore Coventry CV3 5HI Tel 0203-000000

PHOTOSPECTRA, photographic control and calculation of b/w and colour processing and printing on 48K Spectrum Free details from Derek Lange Manor Close High Street Thornborough Bucks MK18 2DF

ASTROSPECTRA, astrological chart display for 48K Spectrum many features, complements other existing programs. Free details from Derek Lange, Manor Close High Street, Thornborough Bucks MK18 2DF

007 SPY Lets you stop and copy any previously unstoppable Spectrum cassette ON cassette £2.95 Bobker 29 Chadderton Drive Unsworth, Bury Lancs

SPECTRUM GAMES Penetrator, Timegate Arcadia, Transtower Flight Simulator Blind Alley Froggy 3DVU Partiesters Cruising on Broadway etc Must sell quickly £2.50 each or any 5 for £9.95 Send PO/Cheques to R Habermacher 32 Langley Road Small Heath Birmingham B10 0TL

48K SPECTRUM SCREEN TOOLKIT Two functions in one routine Enlarge top/bottom of screen (details height) Scramble all screen contents in impenetrable code! Cassette £2.50 Send cheque/PO (or SAE for details) to Ian Stewart, 17 Tany Drive Alva, Scotland FK12 5NQ

007 SPY Lets you stop and copy any previously unstoppable Spectrum cassette ON cassette £2.95 Bobker 29 Chadderton Drive Unsworth Bury Lancs

VIC EPROM PROGRAMMER. Programs reads verifies checks for blanks 27/2516 — 2K 27/2532 — 4K, 2764 — 8K complete plug-in unit + instructions and cassette software Total price £35 inclusive PPJ Projects 31 Pilkington Road nRadcliffe Manchester M26 0PF Tel 061 724 9677

BBC (B) CHARBUILD Define custom characters with Load Save Reflect Rotate and Inverse Option Includes Greek alphabet, £3.50 J Olive, 1 Roman Road Basingstoke Hants

SPECTRUM SNIFFER, Reads tapes and prints out program name length in bytes and start address machine Code and Basic! Also gives auto run line number £2.50 from AWA, 50 Dundonald Road Didsbury Manchester

DRAGON USERS Disman new powerful disassembler monitor Over 20 commands Gets right into the machine Option more drivers Cartridge Send £16.95 KeyJay 13 The Boulterd Gorleston Great Yarmouth, for prompt delivery

TELETEXT ON YOUR SPECTRUM ZX text lets you create your own personal teletext system Similar to Ceefax and Oracle Capacity 800 pages Full colour graphics, flashing inverse video 24-hour clock with alarm even the engineering test pages — it's all here! Cassette £4.95 complete with sample system Full instructions and 12-month guarantee Send cheque/PO (or SAE for details) to Ian Stewart 12 Torry Drive Alva, Scotland FK12 5NQ

SPECTRUM BACK-UP COPIER
First of all you had to back-up programs by making tape-to-tape copies Now KEYSOFT Presents
THE KEY
100% machine code! Copies any type of program Easy to use
Send THE KEY for any ZX Spectrum Only £3.95
KEYSOFT Dept PCk
8 Brook Grove, London N17 8AB
NB KEYSOFT advise users not to infringe the Copyright Acts
Dealer Enquiries welcome

SPECTRUM at PRINT amazing software that gives 64 characters per line instead of 32 prints anything from your Basic program cassette 48K or 16K £3.50 K Ahmed 28 Magpie Hall Lane Bromley Kent

SPECTRUM KOPYKAT £4.95
100% machine code Enables back-up of any ZX Spectrum program or data-file to be backed-up on to a fresh tape
Programs over 41.5K (8.7K for 16K Spectrum) can now be copied with ease
Plus FREE Tape-header Reader program Both programs on one cassette Only £4.95
IMMEDIATE DESPATCH Send cheque/PO to
MEDSOFT
61 Ardeen Road Doncaster DN2 5AB
IT CAN EVEN COPY ITSELF

DRAGON KOPYKAT Copies machine code programs Send 80p + SAE to 19 Crumpax Avenue Longridge Preston

ZX81 COPYKAT, £1 Stop and copy any unstoppable ZX81 program For short listing (one minute to enter) £1 Swain 15 Bannister Close Greenford, Middlesex UB6 0SW

SPECTRUM COPYCAT Make security copies of your favourite programs Copies any Spectrum tape file 16/48K Easy to use £4.95 from AWA, 50 Dundonald Road Didsbury Manchester

SPECTRUM "SNIFFER" Reads tapes and prints out program name length in bytes and start address Machine Code and Basic! Also gives auto run line number £2.50 from AWA, 50 Dundonald Road Didsbury Manchester

HARDWARE

BROKEN JOYSTICK?
STRONGER joystick insert replacements supplied with full fitting instructions 3 YEAR GUARANTEE
£2.50/pair inc p&p
SOFTWARE FOR ATARI (TM) 400/800
All cassettes under £5
Send s.a.e. for list
Computer Supplies (PCW)
146 Church Road
Boston Lincs PE21 0JX

FREE
computer tape with every order
ROSCO LTD
5¼" BASF Ready discs SS/DD £14.95 (box of 10)
Listing paper from £8.70 (box of 2,000)
★★★★ Special Offer ★★★★
STAR DP515 80 column 100cps Printer £200 All prices excluding VAT and p&p. under £100 add £3 For full details and prices of all computer consumables and printers ring 021 356 7402 or write to
ROSCO LTD Freepost
Birmingham B20 1BR

CLUBS

DRAGON USERS CLUB INTERNATIONAL. Free membership newsletter software hardware, reviews Send SAE to Ainsley Heaton 9 High Market Place Kirkbymoorside North Yorkshire

PROGRAMMERS. Keep your software copyright, very high returns possible Join our Marketing and Advertising Club Send tapes and enquiries to Lonpheis Software, Arkwright House, Alexandra Road Llandrindod Wells Powys

VIC20 OWNERS GROUP Includes monthly newsletter software library software exchange and much more Write to S N Tomanek, 20 Milner Road Sherwood Nottingham

CRS EXPRESS BBC only Reliable software exchange club Send SAE for details CRS Express 7 Carlton Mews Heighington Lincoln LN4 1RS

SOFTWARE CITY SOFTWARE CLUB
Massive list of games tapes and discount
For Spectrum Dragon 32 VIC20 BBC Sharp Apple
TRY BEFORE YOU BUY
SAE FOR LIST
18 THEOBALD STREET
BOREHAMWOOD HERTS

CALEDONIAN computer consultants provide programming consultancy and training courses in Basic held regularly for beginners upwards 292 Caledonian Road London N1 1BA. Tel 01-607 0157

SOFTWARE EXCHANGE. Swap your used software via our club Free membership £1 per swap Most computers included S A E for details UKSEC 15 Tunwell Greave Sheffield S5 9GB

ORIC-1 OWNERS. Tangerine created Oric-1 now TUG creates the rest. An independent users group with a solid reputation for progressive system support. Monthly newsletters meetings software hardware reviews advice and lots more. We have a proven record of performance on our system Join TUG You'll see us we do! Send £1.00 + S.A.E. (A4) for sample newsletter and details Tangerine Users Group 1 Marlborough Drive Weston Avon BS22 0DQ

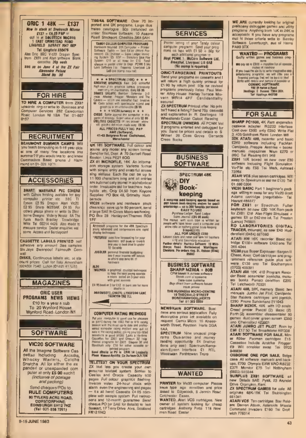
DEALERS

COMMODORE 64 + Vic20
SOFTWARE AND HARDWARE FROM
MOLANSCO ELECTRONICS
Large selection of cassettes and cartridges available including Forth Gridrunner Educational programs etc
Mail orders accepted
Phone Karen
Biggleswade (0767) 318702 (24 hrs)

ENFIELD COMMUNICATIONS
VIC20/64, ZX81 SPECTRUM BBC DRAGON
GAMES EDUCATIONAL BUSINESS
Full range of software and accessories
Send SAE for full list to
ENFIELD COMMUNICATIONS
135 HIGH STREET
PONDERS END ENFIELD
MIDDLESEX Tel 804 7834

COMMODORE 64
£264.00 (excl VAT)
64 Programmers Ref Manual £10.95
+ £10.95 p&p
Tel Chris Gurney Dave Walsh or Floyd Paterson
Tel 01-969 4668 or send SAE
Image Science Micro Computers Ltd
186 Freston Rd London W10 6TH
or cheques P P (add 15% VAT) and £8 for p&p Securicor delivery
Prestel Frame 4000000 (4) for latest software and Peripherals information and copies

ZX81 High Res Graphics Unit
£32 (excl VAT)
Tel William Haynes 01 969 8619
Tools for Living
Notting Dale Technology Centre
191 Freston Road London W10 6TH
Cheque/PO (add 15% VAT) plus 75p p & p



ORIC 1 48K — £137
Now in stock at Snebeech Micros
£137 + £4.25 P&P or
call in at SNEBEECH MICROS
1 EAST GRINSTEAD ROAD
LINGFIELD SURREY RH7 6EP
Tel Lingfield 832475
Also Oric BBC Vic20 Dragon Spectrum ZX81 and Atari software Blank cassettes 30p each
See us on June 4 at the ZX Fair Alexandra Palace Stand No 116

FOR HIRE

TO HIRE A COMPUTER from ZX81 upwards ring or write to Business and Computer Services 292 Caledonian Road London NI 1BA Tel 01-607 0157

RECRUITMENT

BEAUMONT SUMMER CAMPS Will you teach computing to 8-16 year olds at one of many fine locations this summer? If you would like to and know Commodore Basic phone J Hammond on 01-328 1070

ACCESSORIES

SMART WASHABLE PVC COVERS with Cotton binding available for any computer printer etc BBC TI Epson £3 95 Dragon Atari Vic20 £2 95 Sharp MZ80AK £4 95 For others please phone or write to Sherborne Designs Victory House 8A The Rank North Bradley Trowbridge Wilts Tel 02214 4425 Also made to measure service Dealer enquiries welcome Access and Barclaycard

CASSETTE LABELS PRINTED self adhesive any amount See samples Six Jays Swanpool Falmouth Cornwall

DISKS, Continuous labels etc, at discount prices Call for lists Amersham (02403) 7540 Luton (0582) 41 1215

MAGAZINES

ORIC USER
PROGRAMS NEWS VIEWS
£10 for a year's sub
To 20 Wynford House
Wynford Road London N1

SOFTWARE

VIC20 SOFTWARE
All the Imagine Software Cassettes Including Arcadia, Whacky Waiters, Catcha Snatcha All for either the expanded or unexpanded computer at only **£5 00** each!!
(inclusive of postage and packing)
Send cheques/POs to
RULE COMPUTERS
80 TYLERS ACRE ROAD,
CORSTORPHINE
EDINBURGH EH12 7HZ
(Tel 031-336 7261)

TI99/4A SOFTWARE Over 70 Imported and UK programs. Large illustrated catalogue 50p (refunded on order Stainless Software 10 Alstone Road Stockport Cheshire SK4 5AH

TANDY COLOUR COMPUTER PROGRAMS
Hardware required 16K Computer + Printer Software Taddy — text Editor (Word Processor) £5 ... — Sales Ledger Invoicing System £5 ... — Statutory Sick Pay System £10 or all three for £15 Send cheque or postal order to Dept PCWK 3 Mc Corn Software Ltd Freepost Liverpool L19 8AB (no stamp required)

* * * **SPECTRUM (16K)** * * *
CREATIVE GRAPHICS Fast 3-D colourful high resolution graphics formats previously seen only on mainframes Only £6 95
BOOTS GALORE Bomber Defender 3-D maze Attacker Frogger Monsters and The Cavern — all in one cassette! Fast ... 64 Code action with spectacular sound and graphics at an unbelievable £5 95
* * * **VIC20 (unexp)** * * *
CHESS Battle against the computer in this game of strategy Super value at only £5 95
UTILITIES CASSETTE ... all graphic definition made easy £5 95
ALL PRICES FULLY INC P&P
AMZ (Software),
41-43 Belgrave Road Cadishead, Manchester

UK 101 SOFTWARE. Full colour and sound any model any screen format. Send for list, Dept A 70 Sarbell Road Boston Lincs PE21 6OG

ZX 81 MICROFILE, 16K An information storage system Variable format with simple entry and powerful accessing abilities Each file can be up to 11 000 characters long and all entries are automatically stored in alphabetical order Invaluable tool for teachers hobbyists etc. Only £4.50 from Kayone Supplies PO Box 48, Grimsby Humberside

VIC20 software and hardware stock clearance save up to 60 percent, send a large SAE to Coare Micro-networking PO Box 28 Henley-on-Thames RG9 1PF

Arrowsoft programs for the 48K Spectrum using advanced and compression and rapid display techniques
"FUTURES" uses flow forecasting for your business will book or rework one year's cash flow in under 10 seconds
JUGGLER personal financial budgeting see if your income will stretch to afford that new bit of hardware
ALSO WEENIES a graphical musical technique to help the very young operate a micro tested on 3-year-olds with great success
£4 95 each or 3 for £12 ...
ARROWSOFT CHATRI LYNGFORD LANE TAUNTON TA2 7LL

COMPUTER RATING METHODS
Put your computer to good use for pleasure or profit during the 1983 Flat or N/H racing season with the most up-to-date and professional computer rating method ever put on sale to the racing public giving you top-rated selections at good prices Lasts a life-time Cassettes for ZX81 and Oregon 32 ... Printed programs for ZX81 Dragon 32 and Spectrum only £10 for either cassette or printed program
Send details to PO to CRM 14 Lambeth Place ... Co Durham DL5 7DK

TELETEXT ON YOUR SPECTRUM
ZX text lets you create your own personal teletext system Similar to Ceefax and Oracle Capacity 900 pages Full colour graphics flashing Inverse video 24-hour clock with alarm even the engineering test pages — it's all here! Cassette £4 95 complete with sample system Full instructions and 12-month guarantee Send cheque PO (or SAE for details) to Iain Sassart, 17 Terry Drive Alva, Scotland FR12 5NQ

SERVICES

Printer listing of your Tandy colour computer programs Send your programs on tape with £1 50 + 50p for each additional program to
Dept PCWK 1 McCorn Software Ltd, Freepost, Liverpool L19 8AB
(No stamp is required)

ORIC/TANGERINE PRINTOUTS Send your programs on cassette and I will return a high quality printout for £1 90 by return post 60p for revised programs previously listed Paul Weller Arley House Hanley Terrace Malvern WR14 4PF Confidentiality assured

ZX SPECTRUM Printout offer No printer? Need a listing? Send 75p cassette and explanation to R Desforges 19 Wheatlands Close Calcot Reading

SPECTRUM OWNERS All PCWK Vol 2 programs entered and debugged for you Send for prices and details to S Winter 26 Cross Grove Gerrards Cross Bucks

BUSINESS SOFTWARE

SPECTRUM 48K
DIY Book-keeping
A complete book-keeping system based on well known book-keeping system for small enterprises — up to 300 transactions per month
EASY TO USE
Purchase Ledger Sales Ledger
Sales Journal (£24 95 each)
The manual with each tape is written for people who have never used a computer and know little or nothing about book-keeping
3 tapes (£70)
ALL FOR UNDER £230
Lesson plans and notes available for teachers in FE and Secondary education
Further details: Ramis Software 12 Marlborough Road Sankey Warrington Cheshire. For orders ring St. Helens (0744) 55863

BUSINESS SOFTWARE
SHARP MZ80A + 80B
CPM based business software
Stock control systems
Data-base systems
Buy direct from software house at trade prices
THE BUSINESS MICRO-CENTRE
18 THEOBALD STREET
BOREHAMWOOD HERTS
Tel 01 302 5560

NEWBRAIN SOFTWARE. Business and serious application Fully descriptive price list available on request Camix Micro 15 Kneesworth Street, Royston Herts SG8 5AA.

SPECTRUM Nine unusual programs Guarantee and money making opportunity £4 (instructions only see) Spectrum/Kempston Epson Interface £1 RTL Wessetan Perthtowan Truro

WANTED

PRINTER for Vic20 computer Please state type age condition and price asked to Edgecock, 8 Jermin Road Colchester Essex.

WANTED Atari VCS cartridges. New owner of system looking for cheap cartridges Anthony Potts 118 Newman Road Exeter

WE ARE currently looking for original preferably debugged games and utility programs Anything from ½K to 24K is acceptable If you have any programs that fit those criteria write to Barnby Software Leverburgh, Isle of Harris PA83 3TX

WANTED — PROGRAMS
Quality written games and business programs
We pay up to £900 + royalties for all popular makes of machine
If you have the ability to write imaginative and entertaining programs we will offer you a financial package that will be hard to beat
Write with details and sample if possible to
COSMIC SOFTWARE
192 St Helen's Road
Hastings E Sussex TN34 2EH.
Tel Hastings 445199

FOR SALE

SHARP PC1500, 4K Ram expansion cassette adapter RS232 interface Cost over £500 only £250 Write Flat 3 405 Goldhawk Road London W6

32K ATARI 400, recorder and basic £260 software including PacMan Centipede Preppie Airstrike + books manuals magazines Worth £270 or BBC Tel Reading 661 968

ZX81 16K boxed as new over £30 software including Flight Simulation Vu-File etc £55 Tel Mark, Ashtead 73964

ATARI VCS plus seven cartridges. Will swap for Spectrum or sell for £120 Tel 01 660 0206

VIC20 BASIC Part 1 beginner's package willing to swap for any Vic20 Scott Adams cartridge (negotiable- Tel Havant 486877

FOR ZX81 or Spectrum Fuller keyboard as new £20 16K Ram pack for ZX81 £16 Also Flight Simulator + games £8 or £40 the lot. Tel Preston (Lancs) 745881

RD LABORATORIES DIGITAL TRACER, mounted as new £40 Huddersfield (0484) 661080

ATARI 800 16K recorder Basic cartridge £100+ software £450 ono Tel 368 4044

VIC20 plus Super Expander Sargon II Chess. Alien Cert cartridges and programmers reference guide plus software £130 ono Tel Southampton (0703) 455381

ATARI 400 16K 410 Program Recorder Basic assembler joysticks, manuals books Perfect condition £220 Tel Letchworth 70331

ATARI 400, 32K, memory Basic 3 manuals Jumbo Jet Pilot, Centipede Star Raiders cartridges and joystick, £290 Phone Sunderland 211043

SHARP MZ80K, 48K with I/O board Creed printer Pascal (2) Basic (2) Forth (2) assembler disassembler 90 games dust cover green screen £350 ono Chelmsford 422901

ATARI JUMBO JET PILOT Rom by EMI £17 50 Tel Broadstone 691306

ATARI SOFTWARE FOR SALE. Miner 2049er Pacman cartridges £15 Cassettes Include Airstrike Frogger £9 Will consider swap Tel 0703 848838

OSBORNE ONE FOR SALE. Beige case All software manuals and back-ups. £700 Olympia ESW KRO RS232 £375 Monitor £75 Tel Nottingham (0602) 585544

SURPLUS ZX81 SOFTWARE all new Details SAE Pyall, 23 Arundel Drive Orpington Kent.

ZX SPECTRUM GAMES for sale All originals 48K/16K Tel Stubbington 661391

ATARI VCS Ten cartridges Star Raiders Demon Attack, Asteroids Missile Command Invaders £150 Tel Droitwich 778314

SPECTRUM 16K still in box. Excellent condition £60 Tel 017393547

BBC B six weeks old Joysticks software about 40 games, with guarantee. Worth about £650 Genuine sale £450 Tel 01-998 0438 after 4.30 pm

INTELLIVISION CARTRIDGES secondhand vgc 50% list price Tel 0223 871603

Computer Swap 01-930 3266

Free readers entries to buy or sell a computer
Ring 01 930 3266 and give us the details

Spectrums for sale

16K SPECTRUM with software + magazines + cassette switching £90 Tel Brackley 703342 after 4 pm

16K SPECTRUM as new £80 + books £65 Tel Dartford 0322 72857 (evenings)

SPECTRUM 16K, one book Spectrum tape Haler reader Arcadia £90 magazines Offers Tel 01 267 6201

16K SPECTRUM issue two with printer seven rolls of paper two games and magazines £110 Tel Lou 01-807 6307

16K SPECTRUM. Good condition £80 Tel 794-6556 (Room 8)

ZX81s for sale

SINCLAIR ZX81 + 16K Ram + typewriter keyboard + set of software leads manual + box inclusive £70 Tel Hemel Hempstead 54780

ZX81 16K, File 60 keyboard keyboard bleeper Q save loading aid + over £90 software Ring 01 840 7380 for details (after 6 pm)

ZX81 16K plus keyboard and manual £60 ono Tel 01-450 8852 (evenings)

ZX81, 16K Ram + OK Tronics keyboard + case + Mother board + software includes 3D Defender + Q save Asteriods £75 Tel 0291 423048

Tandys for sale

16K ZX81 with leads box manual and tape including Scramble Centipede £90 Tel Barton (North Yorks) 218

ZX81, 16K Ram + joysticks, five arcade tapes, £70 Tel Reinell 57202.

ZX81 with Sinclair 16K Ram all manual and leads + £40 of software £65 Tel 0454 612685 after 5 pm

ZX81, 16K, over 60 games on tape magazines and books £75 ono Tel 041 774 8660 after 4 pm.

ZX81 + 16K guarantee lots of software Flight Simulation ZX Chess II Mazogs 3D Master Maze Frogger etc £80 Tel 061-430 6504

Acorns for sale

BBC JOYSTICKS for sale £8 on offer and BBC software to sell or swap including Acorn software. Tel 01-808 8906 after 6 pm

ACORN ATOM 12K + 12K (4K floating point) via printer-interface £80+ worth of software cassette recorder and leads PSU manuals £158 ono Tel Maidstone (0622) 65003

Dragons for sale

DRAGON 32K, joysticks 7 unused cartridges many tape programs books worth £320 sell for £310 Tel Plumtree (Notts) 4674

DRAGON 32, brand new 12 months guarantee sell or swap for Spectrum Tel 021-449 5076

Ataris for sale

ATARI VCS and Pacman Missile Command casing + Combat, £110 or swap for Spectrum Tel Windermere 5045 after 4.30 pm

ATARI VCS, in perfect condition 7 cartridges including Space Invaders, Missile Command and Star Raiders worth £300 will accept £130 Tel Guildford 38560 evenings or weekends

ATARI VCS + 5 tapes Defender Combat, Outlaw etc £125 ono Tel 01 361 2415

ATARI VCS, 6 months old still under guarantee 5 tapes joysticks mint condition £90 Tel 360 0311 after 6 pm

Commodores for sale

VIC20 + cassette joystick many cassettes magazines books, dust cover £160 Vic 1515 printer box of paper £160 machine code monitor £25 super expander £25 2 adventures £18 each Rat Race + 2 others, £15 each, offers Tel 0440 703357 after 7 pm

8K RAM PACK + Startrek Alien cartridge Avenger £65 Tel 0783 288620

VIC20, C2N Blitz, Frogger Dominoes perfect condition, boxed £140 ono Tel 061-941 2663 (6 pm)

VIC20 + C2N cassette + 8K Ram + Omega Race cartridge + joystick + lots of software including Martian Raider + Cosmiads + lots of books will accept £300 or very nearest offer Tel 01-445 5865 after 5 pm

VIC20 + 3K cassette unit, joystick, super expander 4 games cartridges 18 cassettes including Vicman Frogger and Mysiss board magazines for £200 Call Telefield efel

VIC20 16K Ram pack C2N cassette deck, joystick, £140 ono Call 0734 798130

VIC20 + 16K + C2N cassette deck super expander 8 cartridges 4 tape games 1 Mode Revision joystick + over £30 of books and magazines £310 ono Tel 0835 825637

VIC20 tape deck super expander 8K motherboard joystick, £50 of books worth over £375 sell for £180 Tel 01 906 8145

For sale

OMEGA RACE for Vic20 Swap for any adventure or sell for £15 ono Call Staines 59753 between 6 pm and 7 pm weekdays

FIDELITY mini sensory + mains adaptor in original box, £26 ono Tel Wheathil (OXI 324) 419

STACK STORE BOARD + 3K (expandable to 27K) + VicKit II £60 ono Tel Horwich 0204 68094 after 6 pm

POP COMP Vol 1 No 1 to Vol No 20 offers please Tel Porthcawl 065671 6304

SENSORY 9 CHESS COMPUTER for sale can solve mate 7 mint condition cost £170 will sell for £129 Tel Doncaster 721456 after 6 pm

SWAP WHITE FLYING V GUITAR + hard case for Atari 400 16K Tel Leicester 0533 358468 (after 6 pm)

FOR SALE. Computer books for Oragon Vic20 Programmers Reference + others Commodore 64 hardly used Tel Tonbridge (0732) 361890

SWAP ELECTRONIC JET FIGHTER for ZX81 16K Ram pack. Tel 01-857 5850

VIC20 software hire price Call 01 577 2476 any time

IF YOU OWN a Tandy colour computer and are interested in swaping software +/or information tel Pelsall (0922) 681618

APS JOYSTICK INTERFACE, with joystick £15 Tel 021-380 1461

UNEXPANDED VIC20 cassettes Star Wars II Naval Attack + Space Hopper swap for anything Tel (after 4 pm) Winchester 0962 2408 (local callers only please)

TEXAS TI99/4A, perfect condition 2 months old with cassette leads under guarantee £110 Tel Coombe Hill 715 (Gloucester)

FOR SALE ACORN software for BBC model B offers Tel 01 788 8093 after 8 pm

LYNX 48K + book + tapes worth £13 mint condition unwanted gift will accept £195 Tel 01-366 4321

LOTS OF CARTRIDGES for Vic20 mostly from Audiogenic and Commodore going at very cheap prices also Rabbit's Anhilator Quackers etc £10 for the six Tel 01 387 8751

VIC20 CARTRIDGES, including Mini from Audiogenic very cheap prices also Rabbit's Knell Quackers Anhilator Galactic, Crossfire Orbis + Alien Soccer for £10 + many others Tel 01-387 8751 after 6 pm

ATARI CASSETTES Pinball Pacman Space Invaders Missile Command Adventure Laser Blast Kaboom Combat + two joysticks £125 or separately Tel 01 664 8585

C2N CASSETTE RECORDER for Vic20 £100 software only £50 swap Mission Impossible cartridge for Gorf Tel 01-455 5780

ARFON EXTENSION BOARD 7 slot 16K memory pack 8K memory pack + 3K high resolution memory pack £110 for the lot or £50 for extension board £60 for memory Tel Liverpool 7273317 (Nicholson)

EPSOM MX70 PRINTER, 8 column dot matrix parallel printer with dot resolution graphic low useage £150 ono Tel 01 874 8244 (Mike)

TI99/4A thermal printer £100 Tel 0438 4758

IN EXCHANGE 48K Spectrum £200-worth of Cine equipment Tel Sheffield 0748 3627

INTELLIVISION VIDEO GAME + Football + Tron cartridges unwanted gift £100 Tel Freeans 669120 (after 5 pm)

FULLER KEYBOARD + case + also approximately ?? of ZX81 software including Flight, Football Invaders etc offers. Tel 021 325 4474

GAMES, Spectrum Hobbit, £9 Spectrum Pymania, £8 Atari games Star Raiders £15 Tel 041-427 1480

THREE ZX BOOKS, Spectrum Pocket Book Exploring Spectrum Basic, The Explorers Guide to ZX81 cost £21 sell for £10 Tel Chelmsford 66363

EG 3303 16K sound Pofe printer Interface magazines + books TRS 80 software compatible all worth over £350 will sell for £150 ono Tel 0865 55686

SWAP, software + own programmes Tel 658 1700

SWAP ATARI VCS, for 48K or 16K issue 2 Spectrum with Atari 5 cartridges + joysticks + paddles. Tel 0429 247082

FORTH FOR VIC 20 £15 or swap for Vic Revealed Tank Attack cartridge for 3K or £10 Call 01 676 2129 (after 4 30 pm)

NANA COMP 1 6802, based system machine code programming no case with power supply £45 ono Tel 881 0112 Mr Shaikh

COMMODORE 64 software Buy part exchange or swap your Commodore 64 game We have a great range of Commodore 64 games eg Munchgits which rate been regarded as being better than Pacman 3D Starship Entry Robot Craze and many many others Tel 01-450 4658 Price range £2 99 to £8 98

MATELL INTELLIVISION + voice module + 8 cartridges £250 ono Tel 061 903 8367

MISSION IMPOSSIBLE cartridge Swap for any other adventure cartridge in the series Tel Clevedon 873529

LYNX 48K, as new books and tapes, £195 Tel 01 366 4321

LYNX 48K, 2 year guarantee excellent condition and machine code book worth £15 + cassette leads £180 Tel 044-451173

ACORN SOFTWARE Planetoids £7 Rocket Raid £7 Snapper £7 or all for £18 Tel 061 338 3987 (mornings)

SENSORY 9 CHESS COMPUTER for sale can solve Mate 7 mint condition Cost £170 will sell for £129 Tel Doncaster 721456 after 6 pm

SWAP ATARI 400 DEFENDER cartridge for Star Raiders cartridge Tel 01-200 7026

SOFTWARE for VIC20 new cartridges £12 apiece Cassettes 3.5K cassette and 8K cassette various prices Tel Sheffield 69-2145

VIC20 CARTRIDGES, Lunar Lander Ratrace Jellymonsters £16 Gorf Omega Race £18 Tel 0442 68200

A PAIR OF DRAGON 32 joysticks £10 Snake Moonlander and Invaders £450 Computer Voice £5 Tel 021 476 8425

MEMOTACK 64K MEMORY Little used £40 Tel Andrew 0955-2288 day time

COMMODORE 16K RAM PACK for Vic20 Offers please Tel 05432 53344

SWAP 16K MEMORY module Atari 800 Star Raiders Space Invaders Centipede Rom cartridges Atari joysticks Wantbo Matell cartridges and equipment Tel 0726-60501

ORIC 1 software available Tel 01 445 5988 after 6 30

ACORN BBC software to swap or sell including Acorn software Bugbyte Programs Power A + F + Gemini and many many more Tel 01 874 4122

VIC CARTRIDGES + software for sell Very reasonable prices Tel 01 865 1207 ask for Dave

INTELLIVISION + six games cost £190 ono Tel 051 933 6287

BBC BASIC for Atom board + instruction Book, £35 Tel 01 383 6075

MATELL intellivision cartridge Mazetron £12 Sea Battle £12 Boxing £12 All nearly new All three for £33 or for £22 Tel Harpenden 05827-62984 after 5 pm

STAR SETTLE FOR VIC20, swap for Jellymonster cartridge Tel 021-5560775

Wanted

WANTED 12 inch Green + Black monitor Tel Stadhampton 890 880 (after 7 pm)

WANTED ZX81, fully complete 081 3708705

SWAP Omega Race + 4 ADV + Lazer Zone for CBM vic cartridge Cheltenham (0242) 515460 (6 pm)

WANTED 16K Oric 1 Daren Phillips Sheerness 663918

EXCHANGE, Murphy 40 channel home based station Dipole aerial + Fidelity 40 channel mobile for any micro Vic preferred could travel Tel Ashburton 631 53 (Devon)

8K Ram CARTRIDGE FOR VIC 20, (must be Commodore Rampack) around, £21 Phone 568 5587 (after 6 pm)

ZX SPECTRUM 48K up to £100 Tel Hackmandwicke407628

DRAGON 32 required £100 + awaits each echo machine immediate decision I will arrange collection dispatch Details to A Ellis 22 Tumerson Road St Austell Cornwall PL25 5NX

DRAGON INDEX

MK1 Software is a new company specialising in titles for the Dragon 32

Index 200 is its first release. It enables you to create an index of information in the computer which can then be retrieved by either author name or title

The program is intended for the home user who requires an index for records, books or stamps etc

Program *Index 200*
Price *£5 95*
Micro *Dragon 32*
Supplier *MK1 Software*
30 Painswick Road
Birmingham B28 0HF

LIMITED INFO

Wintersoft has issued an adventure game for the Dragon 32

Called *The Ring of Darkness*, the game consists of several parts which are loaded separately. At the opening of the game you set up your character whose attributes in terms of strength, magical ability, etc, you choose according to what you value most

The arrow keys are used for movement and other commands are given as two or more letters

The information given on the cassette inlay is deliberately limited so that you can experience the pleasure — or irritation — of having to discover everything for yourself

Program *The Ring of Darkness*
Price *£10 00*
Micro *Dragon 32*
Supplier *Wintersoft*
30 Uplands Park Road
Enfield
Middx EN2 7PT

2 ÷ 4

Numerons is the first release I've seen for the Lynx — for some reason this machine has been largely ignored by the software houses so far

Numerons is published by Camsoft which is part of Camputers, the company behind the hardware

The game uses a vaguely *Invaders* like scenario to teach multiplication and division. Each invader is a number at which you must fire a number that divides into it

The other side of the tape contains *Intronum* which explains the scoring system and introduces the game itself

Program *Numerons*
Price *£9 90*
Micro *Lynx*
Supplier *Camsoft*
33A Bridge Street
Cambridge CB2 1UW

GUIDERI

Panic is a game for the Spectrum from Mikro Gen. You must guide a little man who is trapped underground, making sure he is kept away from the lurking aliens

Not that this is a totally one-sided affair — you can retaliate, and pretty viciously too, by beating the aliens over the head once they fall into a hole which you have dug

An added feature is that your air is slowly draining away, so you must defeat the monsters quickly

Program *Panic*
Price *£5 95*
Micro *Spectrum*
Supplier *Mikro-Gen*
Retail Control
Department
6 Royal Buildings
West Glamorgan
SA13 1DN

DOCTORI

Medidata is a company whose aim is to supply user-friendly software for medical purposes. Its first package is *Cycle Planner/Growth Tracker*

This program is designed to enable the female user to predict the various stages of her period cycle

Program *Cycle Planner*
Price *£4 95*
Micro *Spectrum 48K*
Supplier *Medidata*
PO Box 26
London NW9 9BW

DOUBLE BILL

Jupiter Ace owners must have felt that they have been completely forgotten in the software market — so few programs have been issued

Perhaps the situation is changing however, Jupiter Cantab has just made nine cassettes available

Gready Gobbler is a maze game featuring ghosts and power pills — need I say more. Included on the cassette is another game called *Blow Up the World* in which you must blow up all the land on a map of the world which is spinning past you. It must win the title of 'most nihilistic game ever'

Program *Gready Gobbler/Blow Up the World*
Price *£5 95*
Micro *Jupiter Ace (3K)*
Supplier *Jupiter Cantab*
Cheshunt Building
Bateman Street
Cambridge CB2 1LZ

TRAFFIC JAM

The arcade favourite *Frogger* has been adapted for the Vic20 under the title *Froggit*

This version has 21 levels of play and uses the hi-res graphics and joystick

For those few people who have never heard of the game the object is to guide a frog across a road avoiding the traffic which increases as the game progresses

Program *Froggit*
Price *£5 95*
Micro *Vic20*
Supplier *Unit 3*
Meadow View
Browston Lane
Browston
Great Yarmouth
Norfolk NR31 9DP

ROUTINE

Compusense is a company which has issued a number of programs for the Dragon 32

Its latest release is a cartridge — the DASM Assembler — which comes in a package including a manual and a quick reference card for the more experienced machine code programmer

The package is completely compatible with Dragon Basic — enabling you to initialise routines from your own program

Program *DASM Assembler*
Price *£18 95*
Micro *Dragon 32*
Supplier *Compusense*
PO Box 169
286D Green Lanes
London N13 5TN

MATHS TEST

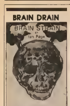
Geometry is a package designed to test your knowledge of the O-level syllabus

Six programs take you through Pythagoras, symmetry, properties of circles, etc. The program also gives you the correct answers through a help function should the answer elude you

Rose Software, who issues the cassette, also has a number of other educational programs available

Program *Geometry*
Price *£4 95*
Micro *Spectrum*
Supplier *Rose Software*
148 Widney Lane
Solihull
West Midlands
B91 3LH

BRAIN DRAIN



Brain Strain is a version of the computer game *Mastermind* for the Commodore 64

The game involves using your powers of reasoning to discover the correct sequence in a series of colours At each guess the computer will tell you how many of your colours are correct and how many are in the correct place

There are three levels which give you four, five or six colours to guess

Program *Brain Strain*
Price *£9 95*
Micro *Commodore 64*
Supplier *ASN Computer Services, 17 Adelphi Crescent, Hayes Park, Hayes, Middlesex UB4 8LY*

MADE SIMPLE

There are a vast number of books on the Spectrum particularly on simple programming

Yet another — *Exploring Spectrum Basic* – uses over 50 programs to illustrate a number of programming techniques It has some useful tips on places to *Poke* how to make the Spectrum run faster, and on using other languages

Book *Exploring Spectrum Basic*
Price *£4 95*
Micro *Spectrum 16/48K*
Supplier *Timedata, 16 Hemmells, High Road, Laindon, Basildon, Essex SS15 6ED*

ON SAFARI

Spectrum Safari is a game which is claimed to be a mixture of adventure and arcade techniques

Your aim is to cross an island and reach a boat to escape Along the way, you may barter with native traders who will sell you various things including other natives

The task is complicated by the animals you may meet along the way, all of whom set you some kind of task or puzzle If you answer wrongly, one of the members of your team gets eaten

The game features a practise routine and three skill levels

Program *Spectrum Safari*
Price *£5 95*
Micro *Spectrum 48K*
Supplier *A J Rushton, 194 Shay Lane, Walton, Wakefield, West Yorkshire WF2 6NW*

MONOPOLY!

Automonopoli is a computer version of the famous board game of property buying and selling

The producer of the game, Automata, is stressing that, unlike some other versions already available the computer plays as well and doesn't just display the board and do the banking

Automata is famous for its *Pimania* adventure game and infamous for its "best possible taste" offerings *Automonopoli* is its first major release in quite a while I can't help thinking that its timing is somehow connected with the general election — maybe Automata is after the Conservative vote — maybe I'm just suffering from *Pimania* induced paranoia

Program *Automonopoli*
Price *£6 00*
Micro *Spectrum 48K*
Supplier *Automata, 65A Osborne Road, Portsmouth, Hants PO5 3LR*

HATCHED!

Vultures is described as a *Galaxian* type game for the Dragon 32 with one joystick

The vultures guard their eggs and swoop towards you while you must try to kill them off However, ultimate victory is impossible since the eggs hatch once one wave has been killed off

Program *Vultures*
Price *£6 95*
Micro *Dragon 32*
Supplier *J Morrison (Micros), 2 Glensdale Street, Leeds LS9 9JJ*

ARMED COMBAT

A number of companies have been interested in producing a home micro version of the *3D Tank Hunt* game found in the arcades

The first version I've seen has been issued by Artic and is called *3D Combat Zone*

The screen displays the view through your tank windows whilst a radar tells you where the enemy is hidden

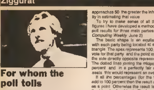
High resolution is used to draw the enemy tank in 3D The object, obviously, is to shoot the enemy, but your missile which can be seen disappearing into the distance, will be spotted and the enemy tank will try to avoid it

The same company has issued two other games at the same time both based on the arcades one being *Galaxians*, the other *Panic*

Program *3D Combat Zone*
Price *£5 95*
Micro *Spectrum 48K*
Supplier *Artic Computing, 396 James Reckitt Avenue, Hull, North Humberside*

New Releases is designed to let people know what software is coming on to the market If you have a new game or utility which you are about to release send a copy and accompanying details to New Releases, Popular Computing Weekly 19 Whitcomb Street London WC2 7HF

Ziggurat



For whom the poll tolls

The opinion polls clearly show that the trend of opinion is away from the Conservative Party towards greater uncertainty in the electorate. With the latest poll I have been able to examine, the Conservative possible vote varies from 39½ percent to 38 percent, the Labour vote varies from 26½ percent to 88 percent and the Alliance vote varies from 15 percent to 32 percent (*Sunday Mirror* 22 May poll on Friday 20 May by Marplan)

In another poll the information for which was collected at about the time of the election declaration the votes were Conservative 46 percent to 36 percent Labour 29 percent to 40 percent and Alliance 16 percent to 26 percent (*Daily Telegraph* 12 May poll previous week by Gallup) It can be seen that the Labour and Alliance votes have stood up during the campaign whereas the possible minimum vote for the Conservatives has declined

This change in relative status has not been noticed by most commentators because of an unfortunate habit to concentrate on percentages without considering non response In the earlier poll the degree of ambiguity (ie non-response don't know or vote for others') was 9 percent whereas in the later poll the degree of ambiguity was 17 percent

By various simulations on a computer I have found that for samples of about 1 000 (most polls claim to have samples of around that size) to claim any greater accuracy than 3 percent either way for a figure is not realistic

So to all the lower figures we should therefore mentally subtract 3 percent (less for the Alliance as lower percentages are inherently more stable) The closer a percentage approaches 50 the greater the inherent variability in estimating that value

To try to make sense of all these different figures I have developed a method of displaying poll results for three main parties (see *Popular Computing Weekly* June 2)

The basic shape is an equilateral triangle, with each party being located at an apex of the triangle The apex represents 100 percent of the vote for that party and the point in the middle of the side directly opposite represents 0 percent The dotted lines joining the midpoints are at 50 percent and in a perfectly fair distribution of seats this would represent an overall majority

If all the percentages (for the three parties) add to 100 percent then the result can be plotted as a point Otherwise the result is a triangle — the *triangle of ambiguity* The larger this triangle the greater the lack of knowledge about voting intentions

Around the ambiguity triangle is the *triangle of confidence* This is a tentative measure of the amount of variability in the estimation of the percentages Maybe 19 times out of 20 the correct result is within those limits, but we cannot be sure We can be reasonably sure that the true result is somewhere within the confidence triangle but views change with time

The clearest trend in the polls so far has been the increasing size of the ambiguity triangle from a small shape in the first poll to a rather large triangle for the last poll (22 May)

Another trend shows the ambiguity triangle moving towards the centre of the major triangle (the triangle of dominance) support for both Alliance and Labour is keeping up but the support for the Conservatives is less firm If those trends continue the possibility of a hung parliament is greater than it would appear

The accuracy of polls has always been suspect, and perhaps one reason is the lack of attention payed to those who do not know or who say they may vote for other parties

Polls in chronological order of sampling

1 *Daily Telegraph* 12 May (week before), Gallup
2 *Daily Telegraph* 19 May (week before) Gallup
3 *Sunday Times*, 22 May (Tues/Wed), MORI
4 *Daily Express* 20 May (Thurs) MORI
5 *Observer* 22 May (Thurs/Fri) Harris
6 *Sunday Mirror* 22 May (Fri) Marplan

Boris Allan

Puzzle

Standard or de-luxe?

Puzzle No 58

The Downshire Wotzit Marketing Company is a world leader in its field — Wotzits

As you will be aware amongst the many mechanical parts which are to be found in a Wotzit the nubble grommet screws are most vital if the efficient geometry of the design is not to be endangered

In fact, in each standard model Wotzit is found a total of one hundred and fifty-seven screws The de-luxe version contains no fewer than one hundred and eighty-seven of these screws

Last week the factory used 50 500 screws Assuming a 1 percent loss through waste or damage, and that all the remainder were used, how many Wotzits of each type were made

Solution to Puzzle No 54

The only time that the watch shows the correct time under the given conditions is at 5 48 so that must have been the time that I first met Jamie A number of entries suggested 4.15 but LN (4 * 16) = 4 159 and the question states that only the first two digits to the right of the decimal point are displayed

Note in the program how neither the hour nor minutes can equal zero This is to prevent an error condition — LN (0) gives an invalid argument Note also Line 70 where additional zeros are added to the string S$ to ensure that it is of sufficient length when it is sliced in Line 80

```
10 LET H = 1
20 LET M = 1
30 LET H$ = STR$ H
40 LET M$ = STR$ M
50 IF LEN M$ = 1 THEN LET M$ = "0" + M$
60 LET T$ = H$ + "" + M$
70 LET S$ = STR$ LN (H + M) + "0000"
80 IF T$ = S$ (1 TO LEN T$) THEN PRINT T$
90 LET M = M + 1
100 IF M = 60 THEN LET H = H + 1
110 IF M = 60 THEN LET M = 1
120 IF H = 24 THEN STOP
130 GOTO 30
```

Winner of Puzzle No 54

The winner is Gilbert Rigot, Avenue Demolder 8 1342, Ottignies/LIN, Belgium who receives £10

Top 10

Vic20

1	(8)	Introduction to Basic Part 1	(Commodore)
2	(2)	Rana	(Commodore)
3	(4)	Blitz	(Commodore)
4	(—)	Strategic Advance	(Commodore)*
5	(1)	Panic	(Bug-Byte)
6	(7)	Asteroids	(Bug-Byte)
7	(3)	Cosmiads	(Bug-Byte)
8	(5)	Wacky Waiters	(Imagine)
9	(9)	Amok	(Audiogenic)
10	(—)	Introduction to Basic Part 2	(Commodore)

*Cartridge (Figures compiled by Boots & Co London).

Spectrum

1	(1)	Flight Simulation	(Psion)*
2	(2)	The Hobbit	(Melbourne House)*
3	(3)	Penetrator	(Melbourne House)*
4	(5)	Horace Goes Skiing	(Psion/Melbourne House)
5	(4)	Transylvanian Tower	(Richard Shepherd)*
6	(7)	3D Tank	(CR Tronics)
7	(8)	Arcadia	(Imagine)
8	(6)	Football Manager	(Addictive Games)*
9	(10)	Chess	(Psion)*
10	(9)	Planet of Death	(Artic)

*Requires 48K.
(Figures compiled by WH Smith and Son Ltd)

Atari

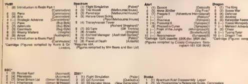
1	(1)	Zaxxon	(Datasoft)
2	(3)	Miner 2049er	(Big Five)*
3	(7)	Preppie II	(Adventure International)
4	(—)	Gorf	(Roklan)*
5	(—)	Shamus	(Synapse)
6	(10)	Protector II	(Synapse)†
7	(9)	Pharaoh's Curse	(Synapse)†
8	(—)	Fryer of the Jungle	(Microprose)†‡
9	(—)	AE	(Broderbund)§
10	(—)	Necromancer	(Synapse)†‡

*Cartridge †32K cassette ‡32K disc §48K disc.
(Figures compiled by Calisto Computers Birmingham 021 632 6458)

Dragon

1	(1)	The King	(Microdeal)
2	(2)	Space War	(Microdeal)
3	(4)	Defence	(Microdeal)
4	(6)	Alcatraz	(Microdeal)
5	(6)	Katerpillar Attack	(Microdeal)
6	(—)	Space Monopoly	(Microdeal)
7	(—)	Mansion Adventure	(Microdeal)
8	(8)	Chess	(Dragon Data)
9	(—)	Typing Tutor	(Dragon Data)
10	(—)	Dragon Trek	(Salamander)

*Cartridge (Figures compiled by Boots & Co London)



BBC*

1	(2)	Rocket Raid	(Acornsoft)
2	(4)	Planetoids	(Acornsoft)
3	(7)	Great Britain Ltd	(Simon W Hessel)
4	(—)	Inheritance	(Simon W Hessel)
5	(1)	Snapper	(Acornsoft)
6	(5)	Arcadians	(Acornsoft)
7	(6)	Meteors	(Acornsoft)
8	(—)	Word Travel Game	(Simon W Hessel)
9	(10)	Chess	(Computer Concepts)
10	(3)	Chess	(Program Power)

*All Model B.
(Figures compiled by Micro Management Ipswich 0473 59181)

ZX81*

1	(1)	Flight Simulation	(Psion)
2	(6)	QS Scramble	(Quicksilva)
3	(3)	3D Monster Maze	(New Generation)
4	(4)	Chess	(Psion)
5	(5)	Space Raiders	(Psion)
6	(5)	Catacombs	(JK Greye)
7	(2)	Galaxians	(Artic)
8	(—)	10 Games for 1K	(JK Greye)†
9	(8)	Gulp	(Campbell Systems)
10	(10)	Scramble	(Woodside)

*All 16K except where noted, †Runs in 1K
(Figures compiled by WH Smith and Son Ltd)

Books

1	(1)	Spectrum Rom Disassembly Logan	(Melbourne House)
2	(2)	Vic Programmer's Reference Guide, Commodore	(Commodore)
3	(4)	Spectrum Hardware Manual Dickens	(Melbourne House)
4	(3)	Assembly Language Programming for the BBC Micro Birnbaum	(Macmillan)
5	(5)	Commodore 64 Programmer's Reference Guide Commodore	(Commodore)
6	(—)	Mastering the Atari Charlton	(Computer)
7	(—)	The Complete Forth Winfield	(Sigma)
8	(—)	6800 Assembly Language Programming Leventhal	(Osborne)
9	(6)	Enter the Dragon, Carter	(Melbourne House)
10	(—)	Computer's First Book of Vic, various authors	(Compute!)

(Figures compiled by Watford Technical Books Watford 0923 23324)



everything seemed tediously normal until
It appeals to the basest human desires (hmph) of greed and social anarchy by tempting (mmm) people to make lots of
AND POSSESS EVERYTHING IN SIGHT.
VOTE PIMANIA!
PIMANIA!
I WANT POWER
POWER!
I WANT TO RULE THE W
we take the 'BORED' out of keyboard
AUTOMONOPOLI UPHOLDS EVERY TRADITION OF THE ULTIMATE BOARD GAME
AT LAST, YOUR COMPUTER CAN PLAY TOO !!!
AND IF YOU CAN'T FIND ANY HUMANS TO PLAY AGAINST WE DARE YOU TO PLAY YOUR SPECTRUM
BUT BEWARE..
IT MAY WELL WIN!!
AUTOMONOPOLI
cut out this ORDER FORM or write us a NOTE, if you don't want to massacre your magazine
snip → ... snip → ... is this a clue →
DEAR AUTOMATA DESPITE YOUR VERY SILLY ADVERTISING I AM ORDERING THE FOLLOWING COMPUTER SOFTWARE FROM YOU
AUTOMONOPOLI (Spectrum 48k) £6 oop tick
PIMANIA (Spectrum 48K) £10 oop
PIMANIA (Dragon32) £10 oop
PIMANIA (BBC Micro 32k) £10 oop
PIMANIA (ZX81 16k) £5 oop
I enclose the right money TOTAL £
or please charge my ACCESS/BARCLAYCARD/MASTER CARD
CARD NUMBER
my signature
my name
my address
Post Code
send to AUTOMATA U K LTD , 65 OSBORNE ROAD PORTSMOUTH HANTS PO5 3LR ENGLAND
all prices include VAT packing & postage within the U K please add 10% to total price for overseas orders Trade enquiries are welcomed
please leave blank
DESPATCH NUMBER
FOR 48K ZX SPECTRUM (2 to 5 players)
LARGE SIZE MOVING BOARD DISPLAY
YOUR SPECTRUM AS 'HONEST BANKER
STATE OF PLAY AT THE TOUCH OF A BUTTON
SAVE GAME FACILITY
VALUE FOR MONEY
YOUR SPECTRUM IS GIVEN A COOL, CUNNING PERSONALITY ..... CAN YOU BEAT IT?
RISE TO THE CHALLENGE OF AUTOMONOPOLI FROM AUTOMATA
"WE PUT SOME THING IN COMPUTING!"